THE METAL INDUSTRY

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ARTISTIC METAL WORK.

Within recent years it is becoming more and more apparent that the people of the United States are rapidly advancing in regard to art in general and especially in their demand for artistically finished articles. The reasons for this advance in artistic taste are probably manifold, not the least of them being the broadening of the horizon of the people by reason of the unprecedented and marvelous commercial expansion of the country. Contributary to this may be the fact that increasing numbers of Americans are yearly traveling over to Europe and that they bring back with them a taste and demand for the artistically finished articles they have seen abroad. Evidences of this increased demand for artistic decorative effects are seen on every side.

This tendency is of the utmost importance to the non-ferrous metal industry, as these metals lend themselves readily to the production of artistic effects. It is only necessary to call attention to the endless variety of effects which can be obtained on the non-ferrous metals by the aid of various finishes. In fact, the number of these finishes has increased so much that already considerable confusion exists with regard to their names and in distinguishing one from another. From the beautiful examples of the coppersmith's and the jeweler's art, finished in the most expensive manner, down to the cheap novelties that retail at an incredibly small profit, the decorative effects obtained by the artistic application of these finishes, some of them of the cheapest possible kind, are simply wonderful in their variety. And with that goes another change, namely, that of elevating the simple workman of former days to something akin and very near to an artist, for it is not only in the handicraft alone that these articles reach the desired effect, but also in the distribution of light and shade, in a judicious use of high lights and backgrounds, which demands artistic judgment. Thus, it has come about that in the production of many of these articles, especially in plated ware, the plating operation as such seems to have been relegated to a more or less secondary position, while the principal place has been taken by the finishing. Not only, however, in small work is the increased taste for artistic decoration manifesting itself, but also in large work where many decorative effects are obtained by the architectural use of sheet metals finished in various manners. The change, such as it is, has been decidedly for the better and is another step in the advances which this country has been making within recent years.

THE USE OF GAS ENGINES IN SMALL INDUSTRIES.

Within recent years the construction of gas engines has been considerably improved and the gas engine manufacturing industry has reached a position where it can supply a good and reliable engine at a comparatively moderate cost. It has not always been that way and one can easily remember the time when gas engine construction was not at all what it should have been, when the processes taking place during the combustion of the gas in the engine were very imperfectly understood and when a diversity of constructions were put upon the market, each one of which seemed to be more involved and more difficult to handle than its predecessor. That under such conditions the claim of gas engine manufacturers, that a fireman could be dispensed with and the engine would run itself, was to be taken with several grains of salt, is easily apparent, and while no fireman was necessary, the engine required very frequently the services of a man familiar with its construction, at such periods, when for some reason or other aparently only known to itself, it refused to "mote."

A gas engine is a very delicate piece of machinery and in order for it to perform its work properly and without giving rise to a lot of troubles, its construction should be carried out in such a manner that the closest attention is paid to all the details of its mechanism, a condition which was mostly conspicuous by its absence in many of the earlier types. In addition to that, many manufacturers showed a tendency to overrate their engines, as far as the horse-power to be obtained from them was concerned, and it was no uncommon occurrence for an engine rated at say five horse-power to get stuck when it apparently had not much more work to do than two horse-power. Ignition devices were also more or less uncertain in their action, giving rise to frequent misfire and consequent annoyances. All these things combined to bring the small gas engine into a somewhat malodorous reputation on the part of the prospective buyers, notwithstanding the fact that there were good gas engines on the market; in this case the good suffered with the bad.

If the gas engine is constructed right and performs its work in the way it ought to, it is quite certain that its use presents considerable advantages, and especially so for small establishments. In the first place it does not need an expensive boiler with its necessary attendance, inasmuch as it requires practically no supervision. It is a cheap source of power, which, like the electric motor, does not eat up any money for fuel when its services are not required. It also makes the small manufacturer quite independent of any other establishment or of any other source of power elsewhere. Furthermore, within the latter years, owing to the improvements in its construction, the consumption of gas has been cut down to a very reasonable figure. In many cases it would be well for people who intend to start a small business to look into the merits of the low power gas engine before deciding what source of power they should adopt.

A prime requisite in the construction of a plating dynamo is the easy accessibility of the brushes, so that adjustments can be made very quickly.

HARDSHIPS CAUSED BY HIGH METAL PRICES.

While a high price for metal may bring prosperity to some of the metal producers, it is at the present time resulting in an almost unbearable hardship upon the brass foundry, particularly the smaller jobbing foundries. These foundrymen complain that it is impossible for them to get higher prices for their castings and if they do demand more they are apt to lose their regular customers who expect castings to be made at the same rate as before, regardless of the increase of price of metals. One foundrymen sums it up by saying that he is at the present time paying 16 cents for selected old copper stock, while a year ago he was paying but 11½ cents and this difference in the prices of metals takes away all of his profit. This condition of affairs results in the foundrymen making castings at cost, simply to hold his old customers. Another feature of abnormally high prices is that manufacturers endeavor to substitute steel or cheaper metals than brass or that the foundrymen tries to make as good castings as formerly out of poor stock. This, of course, in the end results injuriously to the foundrymen. The abnormally high prices for copper and other metals have had the effect in a measure of taking away the profits of the jobbing brass foundry and of the contract foundries and have even forced some of them out of business. It is to be hoped that prices will soon get back to a normal basis.

THE ROLE OF THE POWER PRESS.

The article by Mr. E. H. Porter in the present issue of THE METAL INDUSTRY, describing various constructions and uses of power presses, vividly recalls to mind the great importance which the power press has assumed in the modern manufacturing establishment. In its many-sided applications and the endless variety of articles, some of them of very complicated shape, turned out by it on a large or a very small scale, it has become one of the most important tools of the modern metal working shop. It is like the molding machine and others of similar character essentially a modern machine, marking another step in the tendency towards cheapening the cost of production by turning out a great number of articles. It has evidently filled a demand which existed before its introduction as is shown by the widespread application it has found in a comparatively short space of time. To the credit of the manufacturers it must be said that this demand has been met in a most satisfactory manner and the ingenuity displayed in the construction of the almost numberless variety of presses and in their adaptation to the many requirements of the various trades, is worthy of the highest commendation.

The production of zinc in the world during 1904 amounted to 618,770 long tons, and the United States percentage of the world's production was 26.9. The largest spelter producer in the world is the Vieille Montagne Company in Belgium which produced a total of 87,475 long tons of spelter. The next in importance are the New Jersey Zinc Company group and two Upper Silesian works in Germany with over 29,000 tons each.

POWER PRESSES AND THEIR USE FOR WORKING THE NON-FERROUS METALS.

By E. S. Porter.*

The art of working the non-ferrous metals—brass, copper, aluminum, zinc, etc.—has developed from a crude state to an elaborate science within, comparatively speaking, a short period of time. Some years ago the operations of cutting off, blank cutting and forming were exceedingly simple, but the growing increase of the uses to which these metals are now being put has had the effect of focusing many minds on the improvement of the original and primitive methods used in such work in order to adapt them to the special needs of the various lines of manufacture. A very large number of articles are now being made out of these non-ferrous metals which but a few years ago were produced, or would have been produced by casting, forging or in the lathe, mill machine, drill press or at the bench. The demand for cheaper goods and the great desirability for uniformity of product and interchangeability of parts (lamp burners for instance) have had much to do with the development of these methods. Forming and stamping operations especially have become in many classes of work very complex, and the art of drawing sheet metals has come to a high state of perfection and usefulness. Automatic machines and auxiliary devices for feeding sheets and strips of metal, and for other purposes, having in view rapidity and economy of production, have been invented and brought into service. In this article I will illustrate and briefly describe a few of the machines which are being used in the fashioning of some of the sheet metal articles which pass through our hands every day.

FIG. 1. INCLINABLE PRESS.

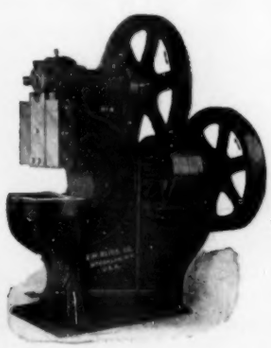


FIG. 2. PUNCHING PRESS.

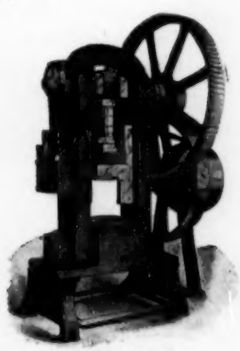


FIG. 3. STRAIGHT SIDE.

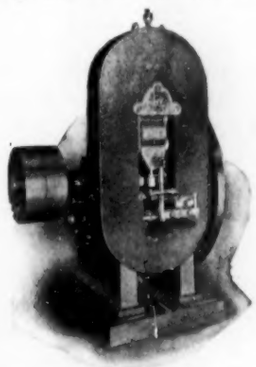


FIG. 4. EMBOSSING PRESS.

Presses may be properly divided by two methods: First, as to the work which they have been designed to perform, as punching, stamping, drawing, blanking, embossing, riveting, wiring, broaching, forming, trimming, bending and forging presses; second, as to their construction, as single action, double action, triple action, double crank, cam, knuckle joint, toggle, drop presses, etc. This latter method may be sub-divided with regard to the frame, whether straight sided or overhanging, upright or inclinable, and whether made of one casting or built up in sections. Users generally designate presses by the first method, while the builders employ the second.

Figure 1 shows the standard type of Inclinable Power Press. As its name implies, the body of this press may be used in its upright position, or can be easily set on an incline to allow the finished article to fall off by gravity. Manufacturers build this type of press in a number of sizes, and they are often made with back gearing when more driving power is required. The range of work for which they are adapted covers nearly every kind of blank cutting, perforating, forming and combination die work in thin sheet metal, including many of the operations required in the manufacture of lamp burner parts, electric light sockets, brass goods, aluminum novelties, zinc fruit jar tops, trimmings, etc. Undoubtedly a larger number of this type of press is used for operating dies for working non-ferrous metals than any other.

Figure 2 illustrates a type of what is known to the trade as a "Stiles" Power Punching Press. Different manufacturers have made their own modifications of this press. The range of work for which this style of press is adapted covers blank cutting, perforating, forming and bending. It is mostly used for making articles out of the somewhat heavier metals, such as locks, window and door trimmings, trunk trimmings, and many other articles made out of sheet brass. The press is adapted for a wide range of work, as most manufacturers make them in many sizes.

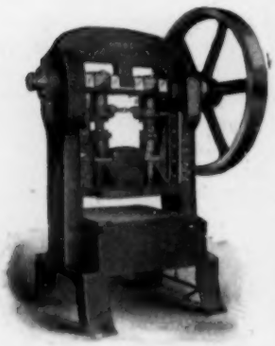
Straight Sided Power Presses, Figure 3, are used for the heaviest kind of stamping, shaping, trimming, punching, etc., in the manufacture of electrical instruments, sewing machines, typewriters and cash registers. They are built with or without gearing, and if the nature of the work demands it, with double or even triple gearing. They are sometimes made with a side punch, adapting the press for trimming drop forging. Then again they are sometimes made with an extra long stroke and an increased die space, adapting them for broaching; also for re-drawing and reducing in the manufacture of seamless copper and brass tubes, and corresponding work. The press shown in Figure 9 is also used for reducing.

While embossing may be done to a certain extent in almost every kind of a power press, the heaviest work requires a special machine, such for instance as is shown in Figure 4. This is the standard coining press used by the United States Mint in the manufacture of coins of all denominations. With modifications, it may be used for embossing silver, brittania metal, brass, copper, German silver, etc., in the manufacture of medals, regalia, jewelry, watches, silverware, etc. They are made to exert a pressure of from 300 to 1,000 tons. The process of coining metal is a subject in itself, and will be dealt with at some later time, by describing the machines used in the United States Mints and taking the metal through the various operations from the time it is received at the Mint in brick form until it is ready for counting.

The subject of double crank presses is a large one.

*With the E. W. Bliss Company.

They are a type of which there are more modifications than any other. While largely used for working the non-ferrous metals, they are particularly adapted for work requiring dies of large area and are frequently made with beds having a distance as much as 8 or 10 feet between the uprights. Figure 5 illustrates a press of this type.



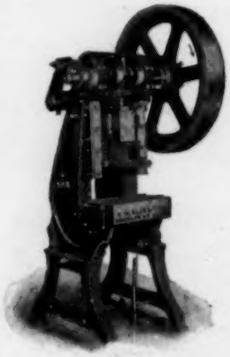


FIG 5. DOUBLE CRANK PRESS. FIG. 6. CAM DRAWING PRESS.

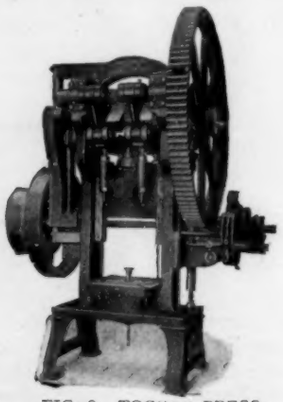
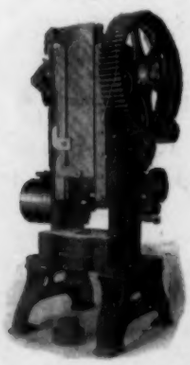


FIG. 7. CAM DRAWING PRESS. FIG. 8. TOGGLE PRESS.

Double Action Presses, *i. e.*, presses with two slides, the outer for cutting and clamping the blank, and the inner for drawing the shell, are divided into two classes, viz., cam drawing presses and toggle drawing presses. The cam drawing presses embody two distanct types, as illustrated in Figures 6 and 7. The machine shown in Figure 6 is used for operating dies for the lighter work, and is also employed for cutting and drawing small shells of brass, zinc, copper, aluminum, and the like. The other type of cam drawing press is sometimes made with a straight sided frame, and is especially designed for cutting and cupping articles of comparatively heavy stock, such as gongs and other bells, telephone cup stampings, door knob halves, heavy brass and copper cups, etc. Toggle drawing presses, Figure 8, are the universal machine for the manufacture of all kinds of seamless drawn metal articles. They are preferable to cam drawing presses in all cases, even for heavy stock where the blanks have been previously cut, or where the metal to be simultaneously cut and drawn is of comparatively light gauge.

In connection with drawing presses, reducing presses are to be mentioned. A press of this type is shown in Figure 9. Reducing presses are used for reducing the diameter and increasing the depth of cups or shells previously cut and formed in double action presses, thereby making tubes of more or less length. They are more universally used in the manufacture of such articles as cartridges, ferrules, pencil tubes, pencil cases, pen holders, match boxes, caps, goblets, gasoline, stove and lamp burner tubes, oil fonts and a large variety of other articles in the brass and silverware lines. They are used for forming, bending and finishing operations on deep work. They are sometimes built with a dial feed as illustrated in Figure 12. Manufacturers build these presses in a number of different types and sizes, adapting them to any special requirement.

Figure 10 illustrates a type of drop press, or drop hammer, as it is more correctly called. It is sometimes made as a belt lift machine, and as such is extensively used in the manufacture of sheet metal goods, cutlery, silverware, etc. These plain drop presses are built in many sizes, the hammers ranging from 50 to 2,000 lbs., the larger sizes being used in the manufacture of metallic ceiling plates, etc. The automatic friction roll drop hammer shown, is sometimes supplied with a larger bed and 4 poppets, making the press available for stamping copper, brass and other sheet metal goods. It is also built with six poppets, adapting it for the manufacture of silver and plated forks, spoons, ladles, etc.



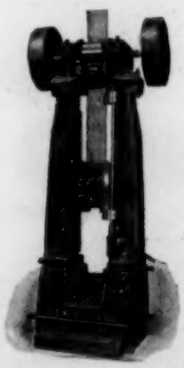
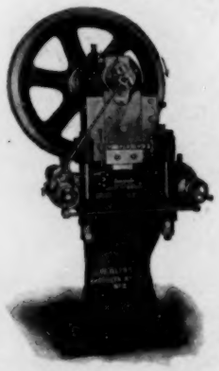


FIG. 9. REDUCING PRESS. FIG. 10. DROP PRESS.



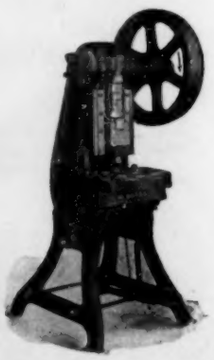
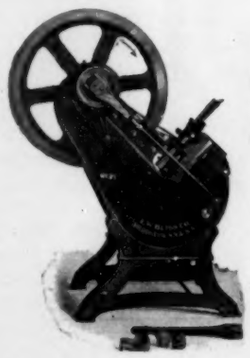


FIG. 11. DOUBLE ROLL FEED. FIG. 12. THE DIAL FEED.

The styles of automatic feeds used in connection with power presses are very numerous, but those most frequently employed by manufacturers of articles made from the non-ferrous metals may be referred to as the single roll feed, the double roll feed (Figure 11), the dial feed (Figure 12), the gravity feed (Figure 13), the push feed, the tube feed, the reciprocating feed, the disk feed, or a combination of two or more of these types, as shown in Figure 14, which illustrates an automatic friction dial and lateral feed. The subject of these automatic feeds and the various kinds of work for which each type is

adapted is very interesting; but as space will not permit to go into detail, attention will only be called to the four types illustrated. The double roll feed, Figure 11, is used for taking strip stock and carrying it under the punches where it is operated upon. The second set of rolls is for keeping the proper tension on the stock and carrying away the scrap. It is used in the manufacture of such articles as small brass cups or shells, shallow brass ferrules, buckles, locks, keys, etc. It may be fitted to almost any type of press.

Dial feeds, as illustrated in Figure 12, are adapted for the second, third or fourth operations on articles previously cut and partly formed. The articles to be operated upon are placed in the pockets of the dial, and as the punch descends, the dial revolves automatically, stopping just before the punch enters the pocket. After the article has undergone the operation, it is automatically thrown out of the dial, leaving the pocket ready for another cup or blank.



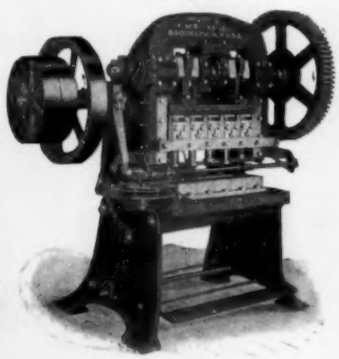


FIG. 13. THE GRAVITY FEED. FIG. 14. AUTOMATIC FEED.

Gravity feeds, Figure 13, are largely used for shaping, trimming or lettering "Mason" fruit jar tops, or for perforating, embossing or shaping shells of brass, copper, tin, silver, etc. All that is required of the operator is to keep the inclined chute full of the articles to be operated upon. These articles are allowed to drop automatically one by one by gravity under the punch, and after having been operated upon they are discharged by gravity.

Sometimes the article to be manufactured requires a series of operations, and when such an article is of the nature of burner shells, lamp sockets, brass stove door knobs, screw tops, lantern parts or similar goods, made in large quantities, a combination feed like that shown on the press in Figure 14 is best adapted. In this press it is better that the first operation cup or shell be made in a combination or drawing die. The work is then placed on a friction dial feed, from which it is automatically carried by a lateral feeding device from one to another of the various dies, passing successively through as many operations as there are dies. These presses can be made with four, five or more die slides if the nature of the work demands it. The capacity of a press like the one illustrated is equivalent to that of from 10 to 15 power presses fed by hand.

This article would hardly be complete if it did not refer to several other machines which rightly belong in the same class with power presses. The most important of these machines are the squaring shear, circle shear, double seamer, screw machine, spinning lathe and the foot and screw power presses. A brief explanation as to the work for which each type is adapted will suffice in the way of description. The double seamer, as its name implies, is for double seaming the tops and bottoms on articles of square, round, oval and irregular shapes. Squaring shears are for trimming and squaring sheet metals of various widths and gauges. Circle and slitting shears are for slitting stock and for cutting circles such as are used for making seamless articles which are drawn in the drawing presses already referred to. The screw machine is for rolling threads on cups or shells which have been previously drawn. The spinning lathe is designed for spinning, burnishing, trimming and wiring work produced in drawing presses.

METHOD OF USING ALUMINUM BRONZE DIES AND FORCES.

By H. O. Winslow.

These are used by the principal manufacturers of Britannia silver plated ware and coffin trimmings, and as the cost of producing highly ornamental work in these dies is but a fraction of the cost of steel dies, it needs no words of recommendation to those who are familiar with them. The castings of dies and forces come from the foundry so smooth that the cost of finishing is reduced to the least possible in die work. The metal in these dies is equal in hardness to soft steel and works very similar in riffling, turning, etc., and takes impression of mat punch about the same. As compared with cast iron dies there is no scale to be worked off from aluminum bronze and the casts are much more perfect. They receive the impression of mat punches perfectly, which cast iron will not, and the crushing strength is about the same, and after the dies have outlived their usefulness there is the value of metal remaining.

These dies are used both in hydraulic and drop presses. It is generally considered that hydraulic presses are the best adapted to the work, as the action is a slow, steady pressure and is not as liable to tear the sheet metal as the blow of a drop would be. This tendency of the drop is overcome by using a coaxing force in many cases, and as the drop is quicker than the hydraulic, in many cases it is the most economical way of doing the work. Much of the success of using them depends upon the skill of the man who runs the press or drop, as there is a limit of strength to the dies, while the strength of hydraulic presses is almost unlimited, and it is very easy for the pressman to make the mistake of putting on too much pressure, although if he uses proper judgment this should never occur.

In striking finely embossed brass and sterling, steel dies are generally used with aluminum bronze forces, and this is where the manufacturer has the opportunity of making a great saving instead of using steel force. The cost of making a steel force is a very expensive item, while the cost of making an aluminum bronze force is very small and works as well, or better than a steel force on metals as hard as brasss or sterling sliver. This is a fact that has been demonstrated by some of the largest manufacturers of these two metals in this country and the writer is willing to furnish references from them, also instructions how to make and use them. The main secret is in the mixture of metal used in these castings, and the fine quality of the castings.

The daily press reports that the galvanized iron roof of the Pennsylvania Railroad terminal at Jersey City is corroded to such an extent by gases from the locomotives that the company has decided to replace it with copper sheathing. The cost will exceed $500,000.

A story has lately been making the rounds of the press about a European process for making metals time proof or keeping them from rusting. Until further data are obtained, it should be taken with the usual grain of salt.

DRY AND GREEN SAND MOLDING FOR ARTISTIC WORK.

By W. N. Nelly.

In the following I intend to give some ideas about sand molding of artistic and ornamental work, the principle of which is very simple but known only by a few. In the molding of pieces where false cores are used and where many castings are required from one pattern, the plaster match saves time and work and gives the best results. The use of plaster and wax is a great advantage in producing some exclusive kind of work.

If, for instance, a pattern is to be produced that needs seven cores all around the sides, the first operation is to set the pattern on a level, smooth surface of

Fig. 1.

PLASTER MODEL AND SECTION SHOWING PLASTER IMPRESSION LINED OUT WITH WAX.

stone, iron plate or a board, that has been sparingly oiled. It is then necessary to take some modeling clay that is not too soft or too hard and the best and cleanest to use is plastelline. With that the cores are made that are wanted around the sides of the pattern. It is necessary to be careful and have the surface smooth and to give about the same shape that would be given to sand cores. The pattern and the cores are then oiled with lard oil and a frame is made of wooden strips just the size of the half flasks that are going to be used. This frame is set on the level surface as would be the nowel of the flask and is filled with liquid plaster of paris.

It is necessary to bear in mind that the thinner the plaster is mixed the weaker it will be when dry. In case the plaster is intended to be strong, so as to make a strong match, it is mixed in the following manner: An amount of water is taken sufficient in the judgment of the operator, and plaster is put in, a handful at a time, and the plaster is left to soak thoroughly. The mixture is then stirred thoroughly and the pattern is

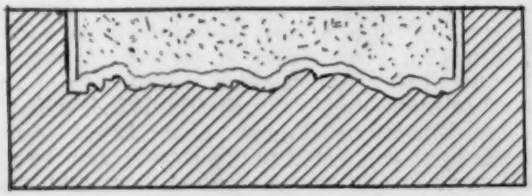


Fig. 2.

BACKING OF THE WAX CAST WITH PLASTER.

painted with this liquid plaster with a camel's hair brush. This operation has to be performed so as not to leave any air bubbles. The liquid is then poured in and the frame is filled. Excelsior, twine, wire or burlap are excellent materials to use in order to make the plaster stronger. On big statuary or ornamental work plaster thus made stronger answers admirably in saving time, and a part of the same mold can also be used over and over if occasion requires. When plaster is used on a large scale ashes, gravel, sand or other like cheap material can be mixed with it in a proportion of one-third to two-thirds and thus a saving in the cost of the plaster is obtained.

After the plaster in the match in question is set, the match is turned over and the pattern and clay cores are taken out. It is then dried and painted with shellac, taking care to use thin shellac and putting on another coating only after the preceding one has been drying for at least 10 minutes. This is carried on until the surface is all shiny and then the match is ready for use. The pattern is then set in its impression and the sand is rammed in the hollows made in the match by the clay cores and then the mold can be made.

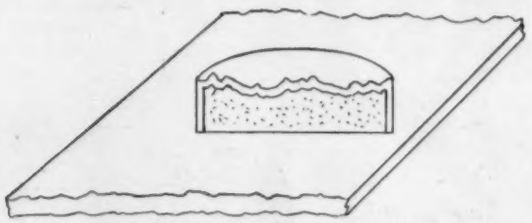


Fig. 3.

WAX MODEL WITH TEMPORARY BACKING OF PLASTER SET ON A BOARD READY FOR MOLDING.

I have cast large pieces in green sand, such as medallions, panels, etc., from one inch to three and a half inches in relief. Of course, it would prove very difficult to make a nowel of such work and then ram the cope in the nowel and cut the thickness of the casting in the sand in the manner as is done in dry sand molds. My method of procedure is as follows: On the plaster model Y made a plaster impression and into this impression run wax by filling the plaster impression with molten wax. The wax was composed as follows:

Yellow beeswax, ½, pure beeswax, ½.

English vermillion and lamp black enough to give the wax a dark red color. The wax was poured in the plaster impression, which was well oiled, the wax not being very hot. When the thickness required was obtained, the wax was poured out again. In this wax cast I made a plaster core by greasing the cast and pouring liquid plaster in it. This core was made to hold the wax cast in shape. It is easy to understand how I would use the wax cast backed up with plaster for model. Putting a couple of coats of shellac on all the wax surface so that the sand won't stick, I rammed the nowel, turned it over, took the plaster core out, rammed the cope, opened the mold and took the wax out. It does not take long for a sand molder to learn how to handle wax models. The accompanying figures illustrate the manner of carrying out the work.

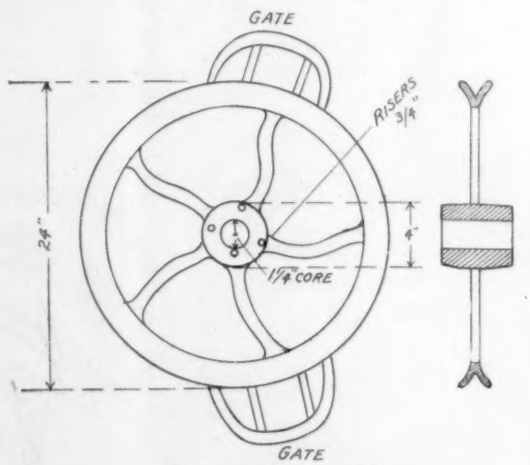
THE WORLD'S PRODUCTION OF LEAD.

Statistical data, recently published for the year 1904, show that the United States far exceed in production of pig lead any of the other countries of the world. In 1904, for instance, the United States produced 298,820 tons, while the next highest country in point of production, namely, Spain, only reached a total tonnage of 183,014. The total production of the world was 981,100 tons, which shows an increase of 68,500 tons, as compared with that of 912,600 tons in 1903. The apparent home consumption of lead in the United States in 1904 was also higher than that in 1903 as it amounted to 323,766 short tons, as against 304,483 tons in 1903.

CASTING ALUMINUM WHEELS.

A case was recently called to the attention of THE METAL INDUSTRY, where a manufacturer experienced trouble in the casting of aluminum wheels. The subject is of interest to the readers of THE METAL INDUSTRY on account of the steadily increasing use of aluminum for a variety of patterns. The wheel which was to be cast is shown in the adjoining figure. It was gated on one side and four risers were put on the hub, as shown by the marks o in the figure. A sand mold was used, which was dried. The actual composition of the aluminum was not known, as it was scrap metal. The hub shrank very badly and the spokes broke at a point near the rim.

In the first place, this wheel should be gated on both sides instead of on only one side. These gates can be on the outside of the casting, but if difficulty is still experienced, it might be well to place them on the inside. This, however, will probably not be necessary. The gates should also straddle the spokes on the wheel, as represented in the illustration. According to the method adopted by the manufacturer, the gate feeds into two of the spokes, which is not a good idea.



METHOD OF GATING.

The hub can be cored all right, but the risers should be cut out altogether and none should be used as they are not necessary, especially in a casting like this. If upon casting the wheel the hub continues to shrink unduly, some chills should be put in the sand so that they will cool off the metal in the hub.

Another point to be suggested is that the metal be poured just as cold as it possibly can be poured. For example, it should barely be incandescent in a rather dark place and, when being cooled off by stirring—in an ingot of aluminum, it should adhere to the ingot being stirred in. Then, when pouring it, it should be forced through the mold, which, of course, is done by pouring it very suddenly and raising the ladle a few inches above the hole into which the metal is poured. The casting is not a difficult one and it should give no trouble.

Another fault sometimes found in casting work in aluminum is that of ramming or packing the mold too tight. Since aluminum has a high shrinkage the sand should never be packed too tight, as it is not necessary owing to the lightness of the metal. The drying out of the mold in this case is also not especially necessary. In the first place some good grade of aluminum should be used. Good castings can only be turned out with good casting alloys. If the casting alloys are mixed by the manufacturer, he can probably get better results with zinc than anything else, by adding, say, about 10 per cent. of zinc to the aluminum. This will make a very satisfactory casting alloy.

DRY SAND CORES AND THEIR USES.

By J. W. SCULLY.

There is a large percentage of the molders to-day that are working at the bench and using more or less cores each day on the work which they are putting up, that are made by the shop core maker. If the foreman were to put those molders on the core bench and would tell them to make their own cores, they would be all at sea and would not know how to go to work to make them. Dry sand cores are, of course, a necessity in any foundry doing a general line of castings, and without them it would be impossible to produce some of the castings that are made every day in all foundries, both in iron and in brass.

It is no small expense to be attached to the cost of the casting, when there sometimes are required a number of cores in one casting. Should one core be made wrong or set wrong by the molder, which is often the case, the result would be an imperfect casting which would find its way to the scrap pile at once. Therefore, great care should be taken by the core maker in making his core and the molder should be careful as well in setting the cores so as to obtain good results and to produce good work. In this way the firm will not be put to double expense by having to make the cores over again and the molder will do the part of the work that is required of him.

Not in all classes of work is the same mixture of core sands suitable for obtaining good results. Some mixtures of metal contain more gases than others and exert more pressure on the core than metals which form less gas. It is important to have the cores as open as possible and at the same time to have them strong. This can be obtained by using a good line of core sand, say 2 parts of dead sand and 1 part of beach sand, or Chicobee sand, with a good core binder, such as flour or core oil. Sour beer or resin may be used, and the cores must be wired properly and must be vented well. If that is done there is no reason why the castings produced should not be perfect.

The Wago core binder gives first-class results when it is used in a proportion of 1 to 50 on brass castings. It leaves a smooth surface and does not stick to the casting, as is often done by cores made with other binders. It is also by far cheaper than flour or resin or core oil, and makes a strong, hard core which is, however, porous. Any one giving this product a trial I think would agree with me, that it is the material long needed in foundries for reducing the cost of the production of castings.

ELECTROLYTIC PRODUCTION OF METALLIC STRIPS.

In a recent patent, No. 799,634, of September 19, 1905, S. Cowper Coles, of London, England, protects a method of producing metal strip, wire, rods, etc., by electrolytic deposition. The cathode which is used to deposit the metal on, is shaped in the form of a mandrel, which is rotated at a high velocity in the electrolytic bath while the metal is being deposited on it. The mandrel is provided with a very fine groove in the form of a helix or spiral, the pitch of which depends upon the width of the rod or tape to be produced. If the groove is not very fine the desired result is not obtained. When the required thickness of metal has been deposited, the cathode with the deposit is removed from the bath and the metallic deposit can then be stripped off in a continuous spiral from the mandrel.

THE ETCHING OF METALS ON A SMALL SCALE.

By Wm. Voss.

One oftentimes sees fancy etched articles with a design in one color and the ground in another. Sometimes there are three and four colors upon one article. Work of this sort is very attractive and sells much faster than the plain goods. In this article I will endeavor to describe the method of etching and coloring as it is carried out on a small scale.

While there are many methods of doing this work, the principles remain the same, that is, a compound is used, which resists the action of the etching acid wherever it remains upon the article. Wherever the metal appears, it will be etched as soon as the etching fluid is brought in contact with it. After an article has been etched it may be plated before removing the acid resisting layer and then the latter may be taken off.

The general method of carrying out the etching process is as follows. The article to be etched must be well cleaned in order to remove oil or grease. This cleaning may be done with a potash solution and the article is then washed and placed in diluted sulphuric acid for a few minutes, after which it is rinsed and dried. Brushing the article with finely-powdered pumice stone is also very good, but it destroys a bright finish. Therefore either method may be adopted, depending upon the finish desired and, in fact, any method may be used providing dirt and grit is removed. If the articles are not clean before the acid resisting compound is applied the latter would come off in the etching bath.

The next step in the process is the coating of the article with some good compound which resists the action of the acid. The design may be painted upon the article or the article may be entirely coated with a resisting material, and after the latter has dried, the design may be engraved through it with an engraver's needle.

The article after being coated with the resisting material or with the design painted upon it, is placed in a drying chamber or oven, the temperature of which to begin must be about 125° F. After the article has been in the chamber for some time, the temperature may be gradually raised. The oven has to be provided with a chimney or a vent in order that the evaporation and drying may go on rapidly. Care must be taken in raising the temperature so as not to get it too high, as in the latter case the acid-resisting compound will begin to blister and will then be useless. Furthermore, if the temperature is too high, when the article is first placed in the oven, the acid-resisting material will run and the higher parts will have only a very small amount upon them, while the lower parts will be covered with a comparatively thick layer. When the resisting material is dry it must have an even hard glossy surface, which should resist the pressure of the finger nail. The article, which has a design painted upon it, would then be ready for the etching bath, while the article, which was coated entirely with the resisting material, would have to have the design engraved through the resisting material. The engraver has to be sure to cut clean through the resisting material to the surface of the metal, as otherwise the article will not be etched evenly. If the resisting material should chip off when the engraver is at work, the trouble may be overcome by a method to be described later on in this article.

The article is now placed in the etching bath, which latter should be kept rocking, in order that the solution may flow over the surface to be etched. The article should also be brushed over every little while, in order to remove the scum, which is formed upon the surface of the work; a soft rubber-bound brush ought to be employed for this purpose. The length of time required to etch an article depends on the strength of the bath and the depth wanted. The etching must go on slowly, for if the bath is made too strong it will act upon the edges of the resisting material and make them ragged. The etching of various articles requires much experience, because the operator has to know when his etching bath is working properly, and he must keep it in good order. Of course, these baths get saturated with metal which destroys their value for etching purposes and a new bath has then to be made up. The same etching bath cannot be used on all metals, such as copper, brass, silver, gold, aluminum, iron, etc., as some of them require baths of entirely different composition.

After the article has been etched deep enough, it may be dipped into a bright dip in order to remove the dark color formed by the etching bath. Articles of copper, brass and bronze are usually treated in this manner and are then brought into the plating or oxidizing bath, after which the resistant material is removed with benzine and turpentine and the article well dried and lacquered.

With regard to the acid-resisting compounds it may be said, that there are many such compounds upon the market. Those used in this method should be in a liquid state. To be sure many of the etchers prepare their own compounds, which they usually guard as secrets. One of the best resisting compounds which can be obtained by the average layman and which gives good results, is the asphaltum varnish. This varnish may be used as it is. I would not recommend the average layman to compound his resisting material, as it takes time and experience. If, when engraving through the resisting material, it should chip off, some beeswax may be dissolved in the resisting compound before coating the articles. This procedure makes the resisting material a little softer, but otherwise no harm is done. Too much beeswax should be avoided. It is best to try the compound before working with it.

As far as the etching baths are concerned, many etchers have their own ideas about them. In the following I will give a formula for a bath which is used by several concerns which turn out thousands of etched articles per day. It is used principally upon copper and brass, and also upon bronze. It consists of a chloride of iron solution, to which hydrochloric acid is added in small quantities, so that the article appears to be etching regularly and clear and that it does not become black. Some potassium chlorate, dissolved in the least quantity of water, is also added in small quantities to just slightly warm the bath. If too much potassium chlorate is added the bath becomes too warm and destroys the resisting material. Chloride of iron may be used alone, but with the addition of hydrochloric acid and potash and occasionally more of the iron solution, the etching goes on more rapidly. After etching, the bath may be kept in a stone jar, in which some pieces of iron scrap are also placed and, when taking any chloride of iron, it may be obtained from this bath.

The above mentioned process can be used when few articles are turned out per day, but where thousands of articles are turned out per day a different process would have to be used. In a subsequent issue of The Metal Industry the writer will describe a method of conducting the operation of etching on a large scale.

ELECTROTYPING FOR VARIOUS KINDS OF MOLDS.

By Edward E. Newton.

The art of making copper and silver electrotypes from molds made of different substances such as plaster of paris, gutta percha, wax, etc., is very useful, inasmuch as it offers a cheap method for having a duplicate or pattern made for further use. Of course, where there are a number of such articles to be made it is always cheaper in the end to make a regular metal mold. Where, however, only one or two copies are wanted the use of the others is very convenient.

Plaster of paris mixed with water is sifted into the water slowly and is constantly stirred until an easy flowing mixture is obtained. This is then poured over the pattern, which latter, if it is made of metal, must be wiped over with a little oil. The pattern is poured slowly from one end in order to drive off all the air. If the pouring is done too fast, there will be holes left and the plaster will probably not enter the deep depressions. The plaster should be made about half an inch thick, so that it can be handled without fear of breaking it. The plaster is taken from the mold when it is well set and any useless edges which may be on the mold are trimmed off. The mold is then placed in a warm place so as to dry it out thoroughly, as all moisture must be removed.

When dried it is immersed in boiling hot white wax and is allowed to absorb considerable of the latter. This operation will take but three or four minutes, after which the mold is allowed to cool. The mold is then ready to be blackened. This is done with the regular finely powdered graphite, such as can easily be obtained. This operation is probably the most important part of the work. A very soft camel's hair brush is used and in conjunction with the graphite, by constantly rubbing over the face of the mold, a very high polish is obtained. The more care is taken in doing this part of the work well, the better the operator will be rewarded by the smooth surface of his type.

When the mold is well covered it is wired. If it is not too large, say six inches in diameter, a wire around the edge will be sufficient. If it is larger, however, it is well to have some branch wires leading from the main wire, which slightly touch the face of the mold. When the deposition has commenced these wires may be changed to some other place. When the mold is all wired, such parts as are not required to have any deposit are painted over with the ordinary beeswax, and a small quantity of alcohol is then poured over the face of the mold.

It is then immersed in the solution whichever it may be, either copper or silver. If it is copper, a solution is used composed of 1 pound of sulphate of copper and 1 ounce of sulphuric acid to each gallon of water, allowing some of the sulphate of copper to remain undissolved all the time in the bottom of the bath. If the type is going to be made in silver, a solution containing 2½ ounces of silver and 1½ pounds of cyanide of potassium to the gallon of water will be found to work best. Whether the type is heavy enough can be determined by removing it from the solution and raising the edge. The operation usually takes from 18 to 24 hours with a good voltage. If the deposit is heavy enough, a knife blade is used to remove it from the mold, and by loosening the edge all around it will freely leave the mold.

Guttapercha is also very useful in taking impressions and making electrotypes. It is softened in warm water and worked well with the hands until it is quite soft, graphite being mixed in during this operation. The pattern is prepared by rubbing graphite over the surface. When it is well covered, guttapercha in the form of a ball is taken and squeezed down hard with the aid of a press if possible. If a press is not available, a heavy weight of any kind will do. The guttapercha is allowed to remain under pressure until it is quite hard and then it can be removed and the pattern be taken out easily. The mold is prepared with graphite in the same way as the plaster and is wired when it is ready for the bath.

The other method which I have previously mentioned for making molds with wax is carried out in the following manner: Take 2 parts of pure white wax and 1 part of spermaceti, melt and mix them together by stirring them well. Prepare the pattern in the same way as for making the previous mold. Use a collar of some metal around the pattern to prevent the wax from running over parts where it is not wanted. Pour the wax in slowly from one end, allowing it to flow over the surface of the pattern until the highest parts of the pattern are covered to the thickness of one-half inch. When the pattern is cold and has set hard it can be removed and the face of the mold can be covered with graphite in the same manner as was done with the other molds. When it is thus covered, the wire is connected and any graphite which may have gotten back of the mold and beyond the wire where no deposit is wanted is scraped off. The mold is then ready for the solution and the procedure is the same as has been previously explained for the other molds.

A good deal of the success of the operation depends on the care which the operator takes in making and preparing the molds. Although the operation may appear simple, a mold may be spoiled when the graphite is rubbed in too hard and some of the fine lines, which may have been in the pattern, are thereby erased. A good soft brush and easy rubbing with the graphite will produce the best results. A copper solution which stands at from 20 to 25 on the hydrometer is at its best.

ARTISTIC CHEAP NOVELTIES.

By Charles H. Proctor.

In going among the stores of the large cities a person sometimes wonders how some of the articles are sold for the price that is asked for them. Take, for instance, the metal novelties in paper weights and bric-a-brac in the shape of animals of various kinds and sizes. They are well modeled and finished in almost the natural color and retailed for ten cents each. There are two or three firms in New York City which make a business of manufacturing this class of articles and, of course, it is the quantity produced that regulates the price. There is no finishing or plating applied to such goods and the articles are cast in flushed molds from the cheapest of antimonial lead. They are then soldered and painted with quick drying colors by dipping them. Girls apply the finishing touches, and it is surprising how many of these articles can be turned out in a day. One firm makes a specialty of high class novelties and uses all the refuse metal in this class of goods. The molds are somewhat expensive to begin with, but when once made they last for years, if care is taken of them.

The value of the world's production of gold during the year 1904 is stated to have been $317,847,082, of which $71,626,801 represents the value of the output of the United States.

A NEW FORCED BLAST BRASS FURNACE.

A new type of crucible melting furnace called the Paxon S. H. Forced Blast Brass Furnace is shown in cut. This furnace was designed and built by the J. W. Paxson Company, of Philadelphia, Pa., the well known manufacturers of foundry supplies, with the aid and suggestion of the Sheeler-Hemsher Company, of the same city, who have seven of the furnaces in operation. The features of the furnace are the crucible feeder and the forced draft. By having the crucible feeder, which is simply an old crucible with a hole in the bottom, placed over the melting crucible, a much greater melting capacity can be obtained. In fact the manufacturers say it doubles the melting capacity. When the bottom crucible has been packed with metal and placed in position the top crucible is filled, and as the metal melts in the bottom crucible, making room for more metal, the ingot or scrap in the top crucible melts and drops down to the pot below. Thus the heat of the one furnace applies to both crucibles. By using forced draft the melter knows when he can get his metal.

A comparison of tests of the natural draft furnace and the forced draft furnace has been made by the J. W. Paxson Company, with the following results:

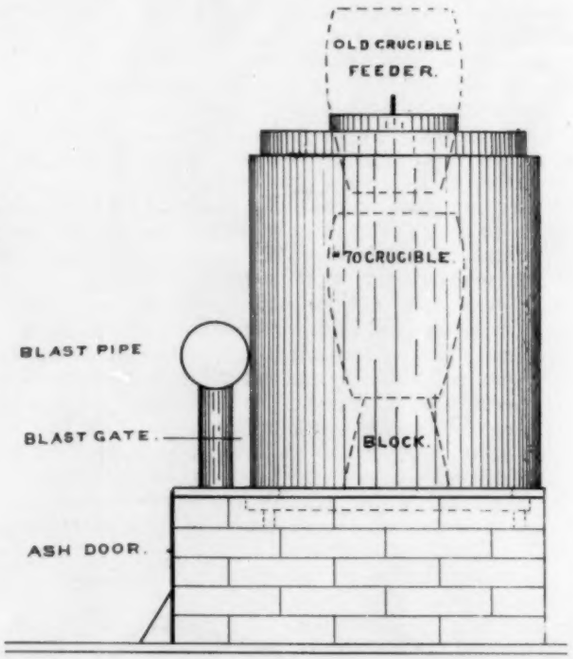
COMPARISON.

No. 5 New Paxon S. H. Furnace with Forced Blast (Round).	No. 5 Old Furnace with Natural Draft (Round or Square).
Fuel used, coal and coke per heat .....80 lbs.	150 to 200 lbs. coal and coke.
Time of each heat 1 to 1½ hours	3 to 4 hours.
Heats per day of 10 hours, 6 to 8	3 to 4 heats.
The metal is hotter and stronger.	The metal is not as hot and weaker.
Inexpensive chimney to carry away the gases and smoke.	An expensive stack 35 to 80 feet high and 12 to 24 inches diameter.
Crucibles will run 12 to 25 heats.	15 to 25 heats.
Blower of positive pressure or fan type.	No blower.
Time of heat, known.	Unknown.
Pressure in ozs..1½ to 6	Unknown, according to the wind.
Blast inlet to each furnace 3 to 6 in. diameter regulated by a blast gate.	All that will go through the furnace with natural draft.
Fire brick lining required 130	Fire brick lining required 130
Fire brick required for base.....50	Fire brick required for base .....None
Old No. 70 Crucible, with bottom knocked out used as a feeder and to deliver hot metal to the crucible in the furnace.	Cannot be used to advantage.
Top Covers: Split or cone shape.	Top Covers: Split or cone shape.

LOSS BY OXIDATION.

In melting:	Per cent.	In melting:	Per cent.
Red brass.....	1	Red brass.....	3 to 4
Brass turnings.....	1½	Brass turnings.....	4 to 5
Yellow brass.....	2	Yellow brass.....	5 to 6

The furnace is built of sheet steel, has draw grate bars and is made in any desired size, single or in batteries. Size No. 5 is 26 inches in diameter and 30 inches high. It takes a No. 70 crucible and melts 210 pounds of metal per heat. The shipping weight is 500 pounds.



FORCED BLAST BRASS FURNACE.

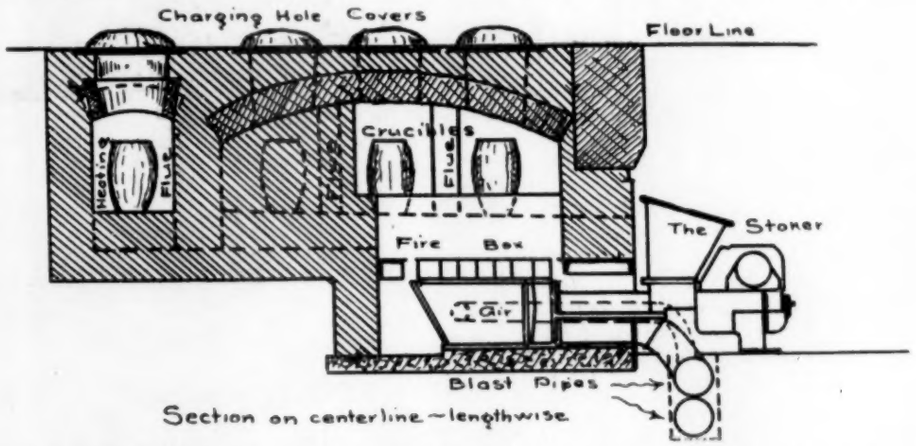
EXTRACTING TIN FROM TIN LEAD ALLOYS.

A process which refers to the extraction of tin from tin-lead alloys has just been patented by C. A. L. W. Witter, of Hamburg, Germany, with U. S. Patent 801,820, of October 10, 1905. Tin alloys which contain a very large proportion of lead could not be profitably treated for the purpose of separating the tin. In this process the alloy is smelted in a rerberatory furnace and when the temperature is such that the molten liquid shows a red glow it is subjected to the action of air. The air is preferably blown on the molten mass of metal. By this means the tin contained in the alloy is oxidized, but at the same time a certain portion of the lead is oxidized as well. An oxide mixture which contains a high percentage of tin is thus obtained and is drawn off from the surface of the metal bath. This is again reduced in the rerberatory furnace and smelted for the purpose of forming an alloy which contains a large proportion of tin.

According to the latest statistics published by the U. S. Geological Survey, the total production of the non-ferrous metals in the United States during 1904 was as follows: Copper, 105,629,845 lbs.; lead, 26,402,000 short tons; zinc, 18,670,200 short tons; quicksilver, 1,503,795 flasks of 75 lbs. net; aluminum, 2,477,000 lbs.; antimony, 505,524 short tons (which figure includes antimony smelted from imported ores and antimony contained in hard lead); nickel, 11,400 lbs. (including nickel in copper, nickel alloy and in exported ore and matte); platinum, 2,600 troy ounces; gold, 84,551,300 troy ounces, and silver, 69,303,319 troy ounces.

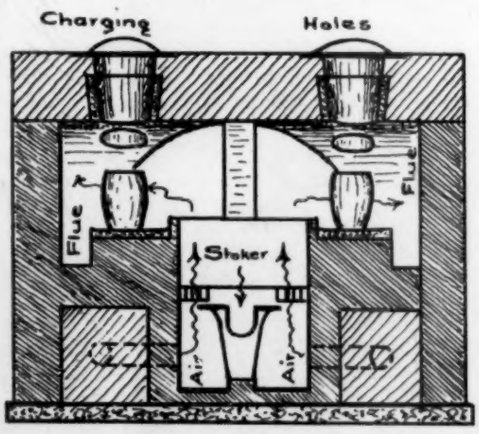
THE NEW STOKER METAL MELTING FURNACE.

In the October number of THE METAL INDUSTRY we mentioned the new American Stoker Metal Melting Furnace which is manufactured and put on the market by the J. D. Smith Foundry Supply Company, of Cleveland, Ohio, and we herewith show the cuts and present a detailed description of this furnace. In stating the facts about their new furnace the makers mention the excellent grade of metal that can be obtained by melting in a crucible. They assert that probably 90 per cent



of those who melt in crucibles use coke as a fuel. The disadvantages of melting metal with coke are summed up as follows:

"1. The extravagant waste of fuel; in common brass practice about one and one-fourth pounds of coke are burned to melt one pound of brass; in aluminum melting



Section across Furnace

probably nine-tenths of a pound of coke will melt one pound.

"2. The loss of crucibles.

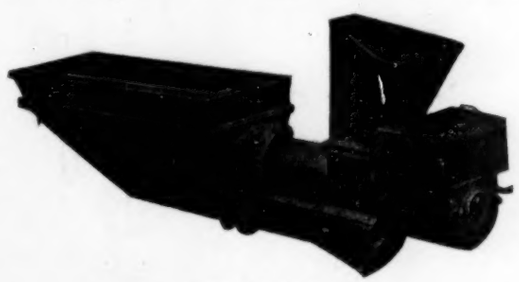
"3. The expense of recovering waste metals from the ashes.

"4. The expense for labor required to keep fires going and the handling of coke; the nuisance of having fuel handled over the melting floor.

"5. The kindling expense in many places is a heavy item."

The makers then say that notwithstanding all these disadvantages the number of users of the crucible and coke furnace is increasing, but that their new furnace retains the good features of crucible practice and reduces the disagreeable features of the coke furnace. The part of the furnace which produces the "revolution" in melting is the underfeed stoker. This takes the coal from the receiving hopper and forces it into the furnace up on to a spreading plate, where it is burned under forced draft. This is done in order to consume all the carbon of the fuel and to utilize all the heat units available. It permits of the burning of a cheap grade of coal and produces an intense heat.

The furnace proper consists of the melting chamber into which the crucibles are charged through holes in the arch or roof. The crucibles are placed on the floor of the furnace, which has a very slight incline toward a collecting channel. The heat resulting from the combustion is utilized to the highest degree by passing it around the crucibles on all sides and then at a much lower temperature into an annealing flue or chamber, whence it escapes to the stack. There can be six or



THE STOKER.

more crucibles in the furnace at one time, all equally exposed to the same heat. The gases from the melting chamber pass into the annealing flue, where the heat remaining is further utilized to heat or anneal the empty crucibles. It is obvious that the object of the furnace is to utilize every bit of heat before it reaches the stack. The spilled metal instead of running into the ashes and coke, is collected in the spill trough or spill channel and is caught on sand, thus avoiding the handling of ashes to recover the metal. The makers are ready to prove all statements they make about their furnace and will be pleased to answer further inquiries.

Metallic nickel is rendered brittle by the presence of arsenic and sulphur. Iron in the proportion of 1 per cent. and upwards is looked upon as objectionable in nickel intended to be used in alloys.

NEW MODEL AND STANDARD TYPES OF TUMBLING BARRELS.

An appliance which has become indispensable to the large manufacturer of brass goods is the tumbling barrel, and the one shown in cut is a new model of the Baird Tilting Oblique Tumbler. It is twelve sided, which arrangement, according to the manufacturers, shakes up the work to better advantage than a round barrel. When used for sheet articles it is made of brass, as a brass barrel is found to be more suitable for delicate work. For finishing brass castings an iron barrel answers the purpose. The crank shaft is back geared 2 to 1, making it easy to raise and lower a heavily loaded barrel. The machines are substantially constructed throughout, and the manufacturers say that they are made of the best materials and of the highest grade of workmanship.

They are designed for grinding and polishing anything in the way of small steel, iron or brass castings, forgings and sheet metal stampings, and are a great labor saver in the matter of cleaning, smoothing, brightening or removing the burr or rough edge from rods, nails, screws, pins, springs, etc. They are especially adapted for wet rolling. One hundred of these barrels are in operation in the factories of the American Pin Company and the Waterbury Manufacturing Company. A number have recently been sold to the Remington

BAIRD BARREL.

Manufacturing Company, of Ilion, N. Y. The barrels are manufactured in two sizes by the Baird Machine Company, Oakville, Conn.

A Western make of Tumbling Barrels is shown in cut. The advantages claimed for it are that the ratchet and pawl on the hand wheel shaft hold the barrel in any desired position and by means of the hand wheel the elevation or angle at which it is desired to operate the barrel, may be adjusted to suit the requirements of the parts to be operated upon. For delicate work the barrel is inclined enough to give the contents a sliding motion rather than a dropping one. For heavier work the barrel is lowered to a more horizontal position and a pressed steel cap which is furnished with each machine is attached to the open end of the barrel.

When sawdust or ground leather is used in these machines, a sieve cover is fitted on the open end instead of the steel cap. The barrel is then lowered as far as possible and the sawdust and ground leather will work out through the sieve in a few moments, leaving the tumbled parts clean and free from dust and dirt. The barrel is made in steel and oak. Further particulars may be obtained from the manufacturers, the Globe Machine and Stamping Co., 970 Hamilton street, Cleveland, Ohio.

GLOBE BARREL.

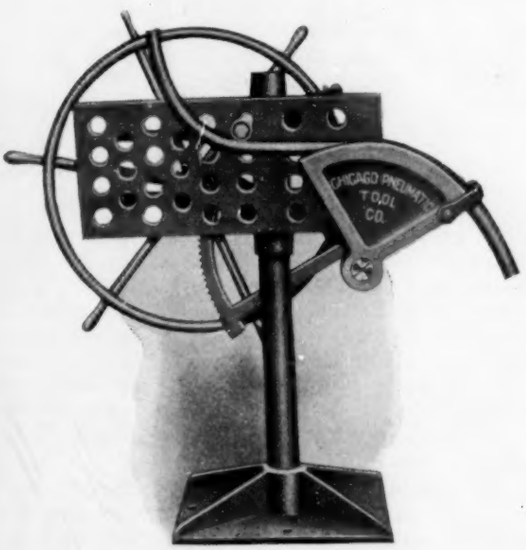
The accompanying cut shows a type of tilting oblique tumbling barrel which is manufactured by Henderson Brothers, of Waterbury, Conn., who have had years of experience in the manufacture of this class of machinery. A feature of the barrel are the four interior ribs, one of which is shown in the cut. These ribs carry up the work as the barrel rolls over and are an aid in the operation of finishing. The barrels are made of sheet steel, sheet brass, cast iron, cast brass and wood, according to the class of work which is to be finished, and they are suitable for wet or dry tumbling. With the adjustable elevation they have a range from the horizontal of about 50 degrees upward and 20 degrees downward. They are made from 24 to 28 inches diameter at the

HENDERSON BARREL.

base. One of the advantages of all oblique tilting barrels is that the work may be seen while the operation of tumbling is going on.

SIMPLE PIPE BENDING MACHINE.

THE METAL INDUSTRY has received a number of inquiries for a pipe bending machine, and while a number of different designs are manufactured, the majority seem to be made for the use of the maker only and are not put on the market. The accompanying cut shows a very simple machine which was formerly made by Pedrick & Smith, of Philadelphia, Pa., but who have sold the rights to manufacture the machine to the Chicago Pneumatic Tool Company, with general offices in the Fisher Building, Chicago, Ill., and Eastern offices at 95 Liberty street, New York. The company is ready to sell the machine to any firm that needs them. By the use of this machine an ordinary helper can bend any amount of pipe to any desired complex curvature in one-tenth of the time that a skilled mechanic would require to perform



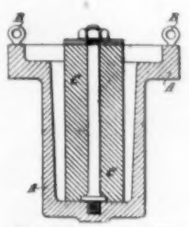
PIPE BENDING MACHINE.

the same amount of work by ordinary devices. As the machine is light in weight it can be carried from the shop to the job or vice versa, and can be secured to any column, stanchion or any available support in a few minutes, or can be used on the stand shown in the cut.

To operate the machine the pipe is placed on top and secured to the edge of the forming quadrant and the fulcrum pin is placed above the pipe and passes through a convenient hole in the fulcrum plate. By turning the capstan wheel in the right direction the power is conveyed through the heavy gearing to the quadrant forming arm, thus bending the pipe to any desired radius. The machine can also be used in the same way for bending light angles, flat bars, etc.

CASTING METAL IN THIN MOLDS.

In a method patented by J. Eaton-Shore, of Rugby, England, with U. S. Patent 801,229, of October 10, 1905, the metal is cast in comparatively thin metallic molds. Before the metal has had time to cool materially these molds are gradually lowered into water or otherwise are gradually cooled from the bottom upwards. This is done for the purpose of insuring the cooling of the metal before the particles of any constituents which differ from the remainder have time to segregate and collect together. Thus a denser and more homogeneous casting is obtained. The thickness of the walls must be varied to suit the nature of the castings and in the case of alloys which fuse at a comparatively low temperature, the mold may be as thin as practical considerations will permit. Sheet steel is suitable in the case of the majority of castings made from the anti-friction metals.



VERTICAL SECTION OF MOLD.

The adjoining figure shows a vertical action of a mold which may be employed to cast a hollow cylinder of phosphor-bronze. The molding box A is of cast iron with two eyebolts B to facilitate the handling. The bore of the molding box is slightly tapered and is of a smaller diameter at the bottom than at the top. This is said to insure close contact of the outer surface of the casting with the inner wall of the mold, which is brought about by the descent of the casting upon its cooling and subsequent contraction. This comparatively close contact is stated to help in the cooling effect when the pouring has been done. In place of a solid core C a hollow core of thin sheet steel may be employed, which in the case of white metal is stated to give much better results. In this way the soft and spongy spots which are formed in the middle part of the casting when it is cast by the ordinary methods are stated to be prevented.

TEST OF CARBORUNDUM DISCS.

In a recent test of 18-inch Carborundum discs on a double grinder working on brass hexagon nuts and smoothing two sides of the nut in one pass through the machine, the Carborundum disc ground at the rate of 3,000 per day. Used on a single face machine, the same disc ground at the rate of 1,900 per day. This record is very interesting, not only in regard to the qualities of the disc, but the capabilities of the disc grinder in replacing the former methods of finishing.

Recognizing the growing importance of the disc grinder as a labor saving tool in many branches of metal working, the Carborundum Works, at Niagara Falls, N. Y., devoted themselves to producing a disc which should meet the especially difficult requirements of this work. Their long experience in the manufacture of cloth and paper for the metal trade and similar lines of work enabled them to do this successfully. The manufacturers say that the Carborundum cloth disc which is now being so generaly introduced is made with a heavier coating of the abrasive than any other disc on the market. The cloth after being received from the mill has to be specially treated and prepared for use. Only glues of exceptionally high strength and binding power can be used. The cloth is made in a continuous machine in long lengths, thus insuring uniformity and evenness of coating. The discs are then died out in circles of various diameters from 7 inches to 24 inches. The Carborundum disc can be applied to any of the various disc grinders on the market.

Zinc roofs are deservedly coming more into prominence. Owing to the layer of oxide which is formed upon the zinc by the influence of the atmosphere and which effectually protects the underlying metal, zinc is the ideal metal for roofing purposes.

CORRESPONDENCE DEPARTMENT

In this Department we will answer any question relating to the non-ferrous metals and alloys. Address THE METAL INDUSTRY, 61 Beekman St., New York.

Q.—Kindly give us a good formula for black dip bronzing on small articles of sheet brass, without the use of ammonia.

A.—There is no formula superior to the ammonia copper dip solution that will produce a good black. If the color is not satisfactory, improved results might be obtained by using carbonate of soda in the solution. An addition of 3 to 4 ounces of this salt might be tried. The articles should also be run, after immersing and washing them, through a 10 per cent. hot potash solution which sets the color.

Q.—We are using arsenic solution for gun metal on brass articles, which solution requires a very high temperature. We have tried all kinds of lined pots but they wear out very quickly. Can you tell us what kind of a pot will obviate the above trouble?

A.—It is not possible to obtain an acid jar for your purpose with a double thick glaze. Probably a lead lining made up from ⅛-inch pure lead with burned-in seams would save the pots. Lead stands all acids except boiling nitric acid.

Q.—Your last issue contained a formula for coating nickel plated castings with sodium silicate. I treated some articles and dried them in a steam heated oven, but when they stood in the atmosphere over night in the plating room I found them to be all sticky in the morning. Please inform me what is the cause.

A.—You have probably used a concentrated solution of sodium silicate. You should reduce the solution sufficiently so that you would obtain an almost invisible coating. By this means you will avoid the stickiness and protect the nickel surface from stains, while handling and assembling the goods.

Q.—Kindly inform me of the uses of black oxide of copper, its sources of supply and market value and the price of copper scale.

A.—Black oxide of copper is used in the production of copper paints, stained glass and in the pottery industry. Its source of supply is obtained from the annealing of metallic copper in the sheet copper, rod and wire industry. Its market value is 30 to 35 cents per pound. Copper scale is produced in the same manner and its market value is 20 to 25 cents per pound.

Q.—I am in need of a finish called old gold finish. It is used considerably on crank cash registers. Please send me what information you have about this finish.

A.—The finish applied to the cash registers referred to may be only an imitation of the old gold finish. In order to produce such an imitation finish a dead surface should be obtained, similar to that for the dull brass finish, and it should be lacquered with a hard transparent lacquer containing a little gold color. Finely powdered sanguine or the best powdered red rouge should be mixed up with chrome yellow, using one part of the sanguine or rouge and one-quarter part of chrome yellow. This mixture should be mixed with oil of lavender and turpentine in equal parts and should be applied to the lacquered surface. While still moist, the color should be removed from the high lights with a rag moistened with turpentine. The articles should be afterwards dried in the lacquer oven. The color can be regulated by a little experimenting in mixing the colors. If the articles are gilded first before lacquering the effect is richer.

Q.—What is a good preparation to use for brushing on metal to stipple a green on it, and dry down without a gloss?

A.—Lacquer the articles first for green finish with French varnish, reducing it one-quarter to one-third with a mixture of amyl acetate and fusel oil. Dry slightly and apply the colors mixed with turpentine and a little hard oil finish varnish. Do not get too much color on the stippling brush. If applied like this it will dry out with a dead lustre. When dried, it may be polished with canton flannel, which will produce a soft lustre similar to the waxed finish. Another method consists in lacquering as mentioned before and then mixing a small amount of turpentine and oil to lavender with hard oil finish varnish. Moisten the top of the brush with that mixture, and then dip it into the dry color and stipple. The back grounds for the greens should be a dead finish produced with a tampico or scratch brush and pumice stone.

Q.—I am silver plating casket handles and use a nitric acid quicksilver dip, rinse in cold water and strike in a small copper solution of about 33 gallons. I rinse again in cold water and then put the work in the silver strike and the regular silver solution. I find that my copper anodes are covered every morning with a film of quicksilver. It has all the appearance of quicksilver and will disappear as soon as the solution is warm enough and working. Kindly inform me how I could prevent this. The castings are either buffed or come direct from the mold. They are made of a lead and antimony alloy. I have no running water but use two barrels of water filled every morning fresh.

A.—There is no doubt that you are not using a sufficient amount of water for your washing operations. A very small amount of mercury carried into your copper solution from the contaminated wash waters will cause the trouble referred to. There does not seem to be any way out of this difficulty unless you copper your work first and amalgamate afterwards. This should give you the same results, or you might use absolutely clean water for rinsing before you place the work in the bath. You may remove the mercury from the anodes by placing them over a charcoal or other fire for a few seconds, by which operation the mercury will be volatilized.

Q.—Please give me the standard density for copper and silver strike and a regular silver solution.

A.—The density of solutions vary according to their composition and there are no set rules. For copper they are usually from 5 to 10 degrees Besumè. For a silver strike it is usual to employ 5 to 10 degrees and for silver plating 5 to 20 degrees give good results. The density or specific gravity of a solution depends upon the amount of metallic salts in solution. For instance, if the silver solution contained 1 ounce of silver and sufficient cyanide for its solution in 1 gallon of water, it would stand at about 5 degrees. A solution containing 3 to 4 ounces would register 15 to 20 degrees. A solution containing 3 ounces of silver to the gallon gives good results and the strike used contains ½ ounce to the gallon.

Q.—Will you kindly inform me what I could use to clean the finger marks from aluminum transmission cases. I would like to have a dip of some kind to dip the cases after they are machined.

CORRESPONDENCE DEPARTMENT

In this Department we will answer any question relating to the non-ferrous metals and alloys. Address THE METAL INDUSTRY, 61 Beekman St., New York.

A.—For removing stains from aluminum and producing a dead white surface the articles should be immersed for a couple of seconds in a hot solution of potash consisting of ¼ pound of rock potash and ½ pound common yellow soap to each gallon of water. The articles should be washed well in cold water and immersed in pale aqua fortis of 38 degrees Baumè. The acid should be placed in a stone jar. The acid does not affect the metal itself but only the oxide formed by the potash, leaving a white color free from stains. After the acid bath the articles should be washed well in cold water, passed through boiling water and dried out in box wood or maple sawdust.

Q.—I have received an order for some balls 4 inches in diameter made of light wood, the surface of which has to be plated with 1-32 inch thickness of copper. On the outside of the copper the balls have to be polished and plated. I tried to rub in the balls with graphite, but did not succeed to get them conducting all over. Then I dipped the balls in melted bees wax, but this made the wood crack. Kindly give me your advice.

A.—Use asphaltum varnish or air drying Japan thinned down with benzoin and coat the wooden balls with a thin layer of this. While they are quite sticky roll them in graphite and allow them to dry. Polish them afterwards with a waxing brush. By proceeding in this way the coating will resist acids and prevent the balls from cracking. It is best to have the balls good and warm before applying the varnish.

Q.—We recently had some trouble in casting brass plates of about three inches in diameter and one-quarter of an inch thick. There are four patterns on a gate. In nearly every heat 50 per cent. of these castings would be defective on account of sand holes in them. These sand holes would only appear in the part where the runner was attached to the casting. We used a number of mixtures without success, one of our formulas being copper 10, tin ¾, zinc ½ and lead 5 ounces. Kindly give us your idea in regard to this.

A.—The trouble may be remedied by cutting the gate under at the casting, and paying attention to having the runner heavy enough to feed the gate without drawing from the casting. The mixture is correct but it should be poured at a medium heat. The sand should not be wet and the molds should be rammed as light as they will hold. The mold should be dipped about three inches at the pouring end. By following these directions better castings should be obtained.

COPPER HANDBOOK.

The fifth annual edition of the Copper Handbook, compiled and published by Horace J. Stevens, Houghton, Michigan, contains 882 pages, divided into sixteen chapters, devoted to the history, uses, teminology, geology, geography, chemistery, mineralogy, finances and statistics of copper. The major part of the book is occupied by a chapter devoted to detailed descriptions of the copper mines of the world, 3,849 in number. These descriptions range from two lines to twelve pages each, according to importance of the property. The price of the book is $5, in buckram binding, with gilt top, and $7.50 in full library morocco and full gilt. The publisher offers to send this book, fully prepaid, on approval, to any address.

READERS' OPINIONS.

Correspondence is solicited from all of our readers on subjects relating to the founding, finishing, rolling and plating of the non-ferrous metals and alloys. Name and address must be given, though not necessarily for publication. Address THE METAL INDUSTRY, 61 Beekman street, New York.

DRAWING SHEET METAL GOODS.

To the Editor of THE METAL INDUSTRY:

I notice in your May number that Mr. D. takes issue with me in regard to the way in which I perform the second operation on the blank for large tops described in my article in the April issue of THE METAL INDUSTRY. My reason for doing the work as I outlined in the article was that after I made my first draw, the metal at the end marked "X" on the drawing was drawing to its limit. You will notice that when I reverse the blank, that the punch end fits the end of the shell and that the draw is taken up on it. Another point is that the punch engages at the point marked "A," which takes the strain off of the end of the shell marked "X." The end of the shell is finished in the first die. In other words the depth of the entire shell is made in the first die and the second die simply shapes it.

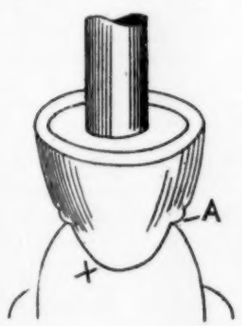


FIG. 1.

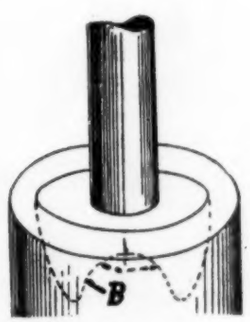


FIG. 2.

In the method suggested by Mr. D., you will see that the punch engages the metal at the small end and turns it back. In this way the end of the punch hardens the metal on the smallest part and when Mr. D. tries to draw the shell back, he is drawing on the point or the end of the punch on the hard part of the shell. The result is that the shell will break at the point marked "B" on Mr. D.'s sketch. The idea which Mr. D. advances is the one that every one tried on the job in question and the result was as I have explained, broken shells.

E. T. KELLEY.

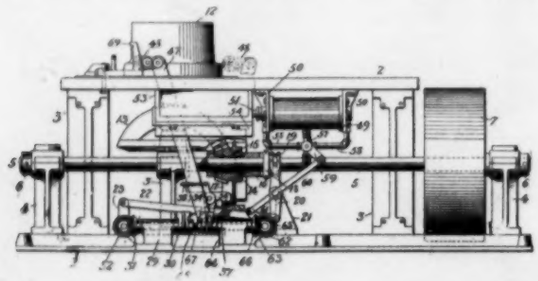
The world's total supply of platinum for the year 1904 amounted to about 300 kilograms or 9,625 troy ounces from South America and 6,000 kilograms or 192,500 troy ounces from Russia. The output of platinum in the United States increased from 110 ounces in 1903 valued at $2,080 to 200 ounces, valued at $4,160 in 1904. Owing to the anxiety in regard to the fate of the platinum industry in Russia, the price of platinum rose about 10 per cent. during 1904.

The total production of gold and silver in the world in 1904 amounted to a value of $347,150,700 for the gold and $97,726,300 for the silver. The total amount of silver produced was 168,493,538 ounces.

PATENTS

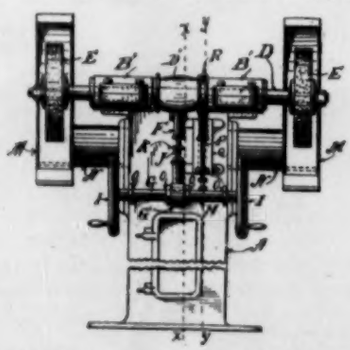
A full copy of any Patent mentioned will be furnished for Ten Cents. Address THE METAL INDUSTRY, 61 Beekman Street, New York.

802,019. October 17th, 1905. Wire Drawing Machine. J. H. O'Donnell, Waterbury, Conn., Assignor to The Waterbury Machine Company, Waterbury, Conn. The wire drawing machine is constructed for the purpose of accomplishing the "stringing" operation by air pressure. The end of the wire is inserted through a die into a grip and by pressure upon a treadle a valve mechanism is operated so that a piston is drawn inwardly and the engagement of a roll with the grip lever causes the latter to swing upon its pivot mounting and draw the wire through the die until the grip assumes the position shown by dotted lines in



the adjoining figure. The movement of the treadle is then reversed and the current of the air cut off when the lever will remain in a stationary position. The end of the wire is then removed from the grip and inserted between a roll and the plug after which by pressure upon the treadle the friction mechanism is actuated and the rotary movement is imparted to the block. This rotary movement continues to draw the wire through the die. When the roll of wire has been completely drawn the treadle is actuated again and this causes the block to stop almost instantly after which the roll of drawn wire can be readily removed.

799,641. September 19th, 1905. Grinding Machine. W. R. Fox, Grand Rapids, Mich. The machine is provided with a shaft which has grinders at each side. It is also provided with effective means of throwing it into and out of operation, and the bearing parts are especially protected. It has also arrangements by which the dust and metallic particles can be conducted away. For this means suitable hoods surround the grinding wheels.



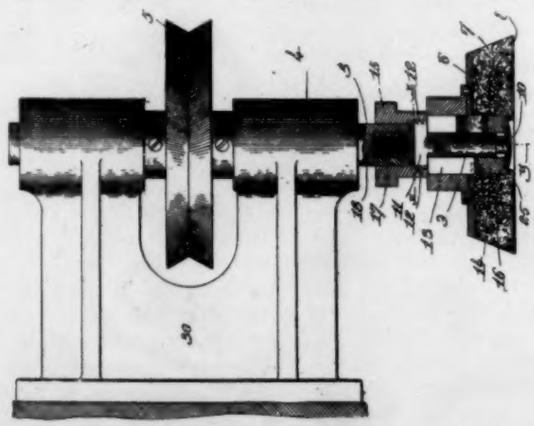
Any article which is to be ground or polished, as the case may be, is brought into contact with the grinding wheels, and by closing the flaps of the hood well down towards the wheel, the grindings are drawn into and down through the hollow base of the machine. The operation of stopping the machine is carried out by a band brake.

799,670. September 19th, 1905. Tube Bending Machine. G. H. Reynolds, Mansfield, Conn. Assignor of one-half to Crane Company, Chicago, Ill. The pipe is bent in this machine by a combination of pressure rolls and a segment, the two grooves of which form a space circular in cross section. Water is admitted into a cylinder, which forces up the pressure roller and firmly holds the pipe at a point where the mandrel lies against the segment. The mandrel is held in a substantially fixed position. Provision is also made for the automatic return of the bending segment when the pressure is released from it. The apparatus is primarily intended for bending pipes of five inches diameter or more.

799,846-199,847. September 19th, 1905. Apparatus for Forming Cores. J. F. Hay, Erie, Pa. Assignor to Erie Malleable Iron Company, Erie. The apparatus provides for the casting especially of T's and elbows, in order to prevent the metal from being porous at the angle. The core is formed in the usual manner in the core box, and chills are forced into the material which forms the core while it is in a plastic condition and confined by the box. In this manner as the chills are forced directly into the material, a firmer grip of the chill is made possible. The chill is provided with a round surface, as this has been found to effect a more uniform and desirable arrangement of the metal fibres at the angle than any other shape.

801,193. October 3rd, 1905. Soldering Iron. W. C. Howard and J. McQuiston, Newcastle, Pa., assignors of one-third to John C. Patterson, Newcastle, Pa. The iron is made hollow so as to form a chamber in which a stick of solder is inserted. In operation the iron is held in the fire and heated so that the stick of solder is melted. The point of the valve which is arranged at the point of the soldering iron is then pressed against the work and thereby the valve is forced from its seat and the solder flows from the channel. When sufficient solder has been delivered to the work, the pressure on the valve is released and a spring then seats it again and closes the channel. The solder is then spread over the desired points with the end of the iron as is done in the usual manner with any other soldering iron. The spring may also be arranged so that the solder is heated by electricity, the coil then forming an electric heater.

802,136. October 17th, 1905. Buffing Machine. J. Busfield, Haverhill, Mass. The pad of felt or similar material is mounted on a spindle, the axis of which is at right angles to the face of the pad. The pad cover with an abrasive outer face is held against the face of the pad. The pad cover is so secured to the buffing wheel that it can be quickly removed and replaced. The pad retainer is located within the spindle and has at its outer end



a clamping face which co-operates with the clamping face carried by the spindle. The buffing wheel is mounted on the end of the spindle and consists of a back plate of metal, leather or any other suitable material, a body portion or pad of felt or similar material which rests against the holder and a pad cover which is secured to the face of the wheel and has an abrasive outer surface.

799,501, September 12, 1905. WIRE DRAWING MACHINE.—Hugh L. Thompson, Waterbury, Conn. The apparatus comprises a drum finished with a necessary means for gripping the wire. A die and a supporting member for the latter are arranged with the axis of rotation approximately in line with the radius of the drum and the die is connected with the supporting member at a distance from the axis of rotation. This arrangement is stated to prevent the jerks on the wire.

PATENTS

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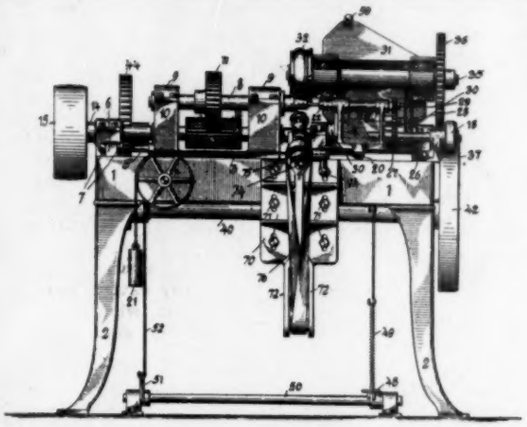

802,082, October 17, 1905. APPARATUS FOR SPINNING METAL.—E. Oldenbusch, New York. The shell to be spun in this apparatus is placed upon the mandrel 8, and the back support 22 is adjusted in position against the end of the shell and the tail-stock clamped. The driving pulley 15 is then started and the mandrel and the shell are rapidly rotated. The driving pulley 42 which rotates the spinning tool is then started. The handle 94 is then depressed and the spinning tool pressed against the revolving shell, which it brings to the desired shape with great rapidity. The finishing roll 32 is then held momentarily against the spun shell, the surplus metal cut away from the open end and the shell removed complete, after which the operation starts again with a new blank.

800,753. October 3rd, 1905. Sand Molding Machine. E. Mistelski and T. Mistelski, Alliance, Ohio. The molding machine is one of the type which uses a set of tampers for compressing the sand around the pattern.

TRADE NEWS

Trade News of Interest Desired from All our Readers. Address THE METAL INDUSTRY, 61 Beekman St., New York.

The Crist Valve Manufacturing Company, of Chittenango, N. Y., announce that they are beginning to turn out goods and have a lot of orders ahead.

The brass foundry of K. Kleinschnitz, No. 61 Noble street, Brooklyn, N. Y., recently suffered a $10,000 loss by fire, which was partially covered by insurance.

The Eynon-Evans Manufacturing Company, of Philadelphia, Pa., are putting in an oil melting plant and are making tests of the Steele-Harvey crucible furnace.

Wm. Sellers & Co., of Philadelphia, Pa., are moving their brass foundry and finishing departments into one building. Their brass work consists of injectors.

Henderson Brothers, of Waterbury, Conn., builders of tumbling barrels, recently built machines for shucking vegetable ivory for the Waterbury Button Company.

William Durst, a manufacturer of brass goods at No. 4 Water street, Brooklyn, N. Y., reports that he now has 100 men in his employ, when last August he had but 45.

Royer & Zweibel, brass founders, of Wilkes-Barre, Pa., have enlarged their works by the addition of a building 62x52, in order to take care of their increasing business.

The H. M. Anthony Company, 48 West Broadway, New York City, announce that their cleanser, "Kalye," can be used on brass work with equal advantage with other classes of work.

The Universal Tool Company, of Springfield, Mass., has issued a circular on their ball cock, called "Try Me," which they say has proved its usefulness after a number of severe tests.

The Athol Pump Company, of Athol, Mass., is putting up a new building near its present plant which will be used as a brass foundry. It is 30 x 30 and when finished will cost about $600.

The property which was bought by R. B. Seidel, Inc., Philadelphia Black Lead Crucible Works, of Philadelphia, Pa., adjoining their present factory, has been utilized for a nicely fitted office and store room.

The October calendar of the J. W. Paxon Company, experts in foundry equipment, at Philadelphia, Pa., announces that it is best to lay in a winter's supply of molding sand before the frost gets in the ground.

The Receiver's Sale in Bankruptcy of the grinders, polishers and platers supplies of The Metal Manufacturers Supply Company, Philadelphia, Pa., was held October 30, at No. 626 Cherry street, Philadelphia.

The Aluminum and White Metal Manufacturing Company have established an office at 336 Broadway, and a factory at Whitestone, L. I. They do spinning, stamping and casting in aluminum, brass, copper and white metal.

Josef Radnai, 284 Pearl street, New York City, who buys and sells the rare metals, reports that he has been buying several lots of 5,000 pounds each of old nickel baskets, which had been used in the plating industry.

The Vulcan Brass Works have completed their new building at Allentown, Pa., in which are included three departments—foundry, finishing shop and plating and polishing room. Mr. Mesiterknecht is the proprietor.

The American Zinc & Chemical Company's plant, located at Utah Junction, north of Denver, Col., has been destroyed by fire, with a loss of $75,000. The management has not yet decided whether or not they will rebuild.

H. M. Shimer & Co., of Philadelphia, Pa., report that they are booked ahead for orders on spelter solder. They are also making progress with their brand of spelter, selling to the brass mills and German silver manufacturers.

The Chicago Brass Company, of Chicago, Ill., has complied with the Wisconsin law by filing a statement and a copy of its articles. The company is capitalized at $800,000, and its interests in the State of Wisconsin amounts to $598,867.

The Evansville Metal Furniture Company, of Evansville, Ind., have been organized with a capital stock of $25,000, and will erect a plant for the manufacture of metal furniture. They hope to begin operations by the first of February.

The brass smelting works of Jos. Rosenthal's Sons, No. 1827 North Second street, Philadelphia, Pa., recently suffered a $20,000 loss by fire. The firm will rebuild a three-story fireproof warehouse in place of the one which was burned.

The Carboy Inclinator Company, of Philadelphia, Pa., who sell an inclinator which is attached to carboys, preventing the spilling of acids, report that they are selling 150 of their inclinators a month to metal workers, chemical manufacturers, platers and every one using acids.

TRADE NEWS

Trade News of Interest Desired from All our Readers. Address THE METAL INDUSTRY, 61 Beekman St., New York.

The Nickel Smelting and Refining Works of C. Upham Ely, at New Haven, Conn., were destroyed by fire last month, but are now being rebuilt. The furnaces of the works were covered and running full blast within 48 hours after the fire.

In February, 1906, The Taunton Crucible Company will complete their new three story factory which is to be equipped with all modern improvements for producing the best Ceylon Crucibles. The Taunton Crucible Company has been established since 1865.

A brass foundry has been opened at Marion, Ind., by Clint Burnett and Gustave Meinshausen. The foundry will be operated in a small way at first. As there is a demand for brass castings in Marion, it is expected that the plant will gradually be enlarged.

The Roberts Chemical Company have begun to rebuild their plant at Niagara Falls, which was destroyed by fire, and expect to have it in readiness by the first of December. They are now in a position to supply promptly all of their customers with caustic potash.

The Ross-Tacony Crucible Company, of Tacony, Philadelphia, Pa., have moved into their new office, which they consider the finest in the crucible business. The office room, which was formerly required in their factory, has been utilized for manufacturing purposes.

L. H. Gilmer & Co., manufacturers of polishing belts, have moved their entire plant to 504 Arch Street, Philadelphia, Pa., where they have larger quarters and greatly increased facilities for manufacturing belts. They are also more centrally located in the business district.

The Kreucke Bros. Manufacturing Company, brass founders and finishers, of 515 Park street, Milwaukee, Wis., suffered a $1,500 loss by fire last month, but are again in running order and have put in six additional furnaces in their brass foundry, doubling their capacity.

The Howe Scale Company, of Rutland, Vt., will erect a new three-story brick building, 50 x 80, which will contain iron, wood and patent shops, photographic room and draughting room. A fireproof vault running up through the three stories will be a part of the equipment.

The brass foundry of Alexander Henderson, at Newark, N. J., has been sold to A. W. Wheaton, a manufacturer of brass goods. The Wheaton factory is to be moved to Railroad avenue, in the rear of which the former Henderson foundry is located. Mr. Wheaton will continue to do jobbing brass work in castings.

For the first time since it was established, 60 years ago, Rice & Co.'s Wire Works, of Lowell, Mass., is running overtime to fill orders. The company are manufacturers of riddles, coal and sand screens, spark guards, iron, steel, brass, copper and galvanized wire cloth. Also bank and office railing and ornamental grilles.

The Liberty Brass Foundry, of Buffalo, N. Y., has filed plans for a two-story brick structure at 1095 Niagara street, which will cost $6,000. Since the establishment of their foundry the Liberty Works have been very successful and now intend to have a thoroughly up-to-date plant for the manufacture of aluminum, brass and bronze castings.

The Empire Chemical Works, 149 Jewel street, Brooklyn, N. Y., desire the nickel waste, old nickel anodes, nickel baskets, nickel oxides of platers and metal workers. They also desire silver sweepings and solutions, scrap aluminum, tin dross, quicksilver, amalgams, scrap platinum and bismuth. The works make a business of smelting and refining the old metals mentioned.

The Peerless Smelting & Refining Company are now settled in their plant at Richmond street and Allegheny avenue, Philadelphia, Pa., and are thoroughly equipped for making everything in the line of white metals. They guarantee to reproduce any samples of metal submitted, are buyers of all kinds of drosses, and the brands they manufacture are known as "The Rainbow."

Queen & Co., Inc., manufacturers of pyrometers and instruments of precision, Philadelphia, Pa., have taken the entire second floor of the building at 8th and Arch streets, which they will use as their showroom and office. The company have a factory in the rear of their showroom. When they move, which will be in November, they will give up their retail business and store on Chestnut street.

The American Tap and Die Company, of Greenfield, Mass., has recently begun operations in their new factory, which is 100 x 50, two stories high and is fitted with modern machinery for the manufacture of taps and dies. The capital of the company has been increased to $75,000 and it has taken over the business of the Nichols Brothers, manufacturers of butchers' and table cutlery.

The brass foundry of the Cramp Ship and Engine Building Company, Beach and Ball streets, Philadelphia, Pa., has recently been making some manganese bronze propeller blades weighing 4,000 pounds apiece. The largest casting ever turned out by the Cramp brass foundry was a manganese bronze stem for a warship weighing 20,000 pounds. The floor space of the Cramp brass foundry has just been doubled.

The Nathan Manufacturing Company, of New York City, have started work on their new four-story brick building, 100 x 50, located at 106th street, near First avenue, New York City. The building is of slow burning construction, will have electric power and modern equipment. The company are in the market for brass working machinery and desire the catalogues of all manufacturers who make brass working tools.

O. J. Moussette, manufacturer of the "Monarch" crusher and pulverizer, Driggs Avenue, corner North 10th Street, Brooklyn, N. Y., has made a number of improvements in his machine. The machine is manufactured heavier, with larger bearings and with steel crushers, the hardest obtainable. Another improvement for brass foundry use is that the roller is made that it can be taken out readily. The barrel can be used as a tumbler to wash and clean brass castings without the roller and as a crusher and washer with it.

By decision of the jury sitting in the Supreme Court of Massachusetts before Judge Parker, the former New England selling agents of the Magnolia Metal Company, George W. Gale and others, will have to pay the Company the sum of $25,346.60 as damages for failing to keep their agreement made in June, 1900. By this agreement they were bound to take 120 tons of Magnolia metal from that company when they had disposed of what they had on hand and also to maintain the selling prices of the metal as fixed by schedule.

The Lanyon Zinc Company is making a specialty of ribbon zinc which they manufacture in lengths of one piece up to 200 feet, all grades and different widths. They are also selling zinc for eyelets, shoe string tips, battery cells and hinges. A quantity of sheet zinc is being sold in New Orleans and Porto Rico for roofing. The sheet products of the Lanyon Company are sold by their Eastern agent, D. D. Smith, St. Paul Building, New York City, while their spelter is sold from their St. Louis (Mo.) office, No. 606 Carleton Building.

The Ajax Metal Company, of Philadelphia, Pa., have bought an adjoining three-quarter-acre lot, 300 x 210 x 50, and are drawing up plans for an addition to their already large plant. They will start to build next spring. When this addition is finished it

TRADE NEWS

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will give them a capacity of 150,000 to 200,000 pounds of metal per day. Their present capacity is 100,000 pounds, and 95 per cent of their product is made for railroad work. The company now own the entire end of the block where their plant is located. Their new stable, 76 x 60, in the same vicinity, will be completed by December 1.

John C. Culbert, 22 Beech street, Pawtucket, R. I., announces that he is in the market for 100,000 pounds of red washings, 100,000 pounds yellow metal washings, 100,000 pounds red metal grindings, 100,000 pounds yellow metal grindings, 250,000 pounds fine washings, 100,000 pounds pin dust, 100,000 pounds magnet machine tailings, and is pleased to hear from any one who can send in the present accumulations which they have on hand, forwarding the samples at his expense. "Spot Cash" Mr. Culbert says he is ready to pay for any amount of metal bearing material up to 500,000 pounds.

The S. Obermayer Company, through their New York representative, have secured the contract for the complete equipment for the brass foundry to be installed by the Fire Department of New York City, in which the foundry is used as a repair shop. The S. Obermayer Company also announce that a quarter-pound sample box of "Partamol," the new parting compound can be obtained from them, and a quarter pound is a sufficient quantity to give "Partamol" a fair test. The company state that those who have used the compound are highly pleased with it. The "Obermayer Bulletin" is another of the Obermayer products which is an organ issued by the company for the instruction of foundrymen.

Proposals will be received at the Bureau of Supplies and Accounts of the Navy Department, Washington, D. C., until 10 o'clock A. M. on November 7th, 14th and 28th, for a variety of metals, supplies and machinery, furnished by the non-ferrous metal industry and kindred interests. Among the items specified are phosphor-bronze wire and strip, Heræus Le Chatelier's pyrometer, German silver, emery wheeels, Norton corundum wheels, carborundum wheels, Wiley and Russell taps and dies, Pratt and Whitney taps and reamers, cutters, Brown and Sharpe reamers and cutters, Little Giant chucks, Westcott chucks, belting, lacing, Dixon graphite, brass, tobin bronze, copper, metal separator and buffing wheels.

NEW CATALOGUES

Catalogue No. 6 has been issued by the Manitowoc Aluminum Novelty Company, of Manitowoc, Wis. It relates to the latest aluminum novelties manufactured by this concern and contains 58 pages.

The Diamond Machine Company, of Providence, R. I., have issued their 1905 catalogue of grinding and polishing machinery. It illustrates and describes all of their various grinding and polishing machinery. They also issue a special catalogue on "Gorton Disc Grinders."

The Rockwell Engineering Company, No. 26 Cortlandt street, New York, is issuing neat leaflets showing their various appliances. The latest leaflet relates to the annealing and hardening furnace, which is especially designed for the makers of tools, dies, taps, punches, cutters, screws, springs, machine parts, etc., which require uniformity of temperature in tempering.

The Brown Specialty Machinery Company, of Chicago, Ill., have just issued a catalogue on the Hammer Core Machine, of which they are manufacturers and sellers. They are now making these machine cores of almost any form. Heretofore they have made only straight round cores. They can now turn out irregular shapes. Their illustrated catalogue describes the machine and its operations in detail.

A new catalogue has just been issued by the Peck Drop Press Works, of New Haven, Conn., describing the Peck Automatic Drop Lifter, Drop Presses, Blast Forges and Wind Gates. The catalogue first takes up the new model Peck automatic drop lifter which was illustrated and described in THE METAL INDUSTRY of October, 1905. The catalogue describes the lifter in detail, and also at the end gives plain sectional drawings, showing how to apply the lifter to drops. The method of applying is so clearly shown that no further explanation is needed, but the company are glad to furnish drawings showing to scale the different sizes of machines and adapted to the conditions that may arise. The catalogue has illustrations and a complete description of all the various drops made by the Peck Company, and which drops are particularly suitable for the manufacture of brass goods, flatware, silverware and fine jewelry.

MEETINGS

The first meeting of the creditors of the Illinois Brass Foundry Company, of Chicago, Ill., was held October 26th by Frank L. Wean, the referee in bankruptcy.

At the meeting of the stockholders of the new Wallingford Metal Company, held recently, the stockholders elected the following directors: F. A. Wallace, Geo. M. Hallenbeck, J. W. Leavenworth, C. H. Tibbits, of Wallingford, and F. P. Welton, A. Kenworthy, A. H. Wells, R. D. Somers and I. N. Welton, of Waterbury. The plans of the new company were discusssed, but no final actions were taken other than the election of the directors. A special meeting of the directors will be called later to elect officers, and it is expected that the construction work on the new rolling mill will begin within a short time.

PERSONALS

Franklin Burton, who has been appointed receiver of the Ansonia Smelting and Metal Company, of Ansonia, Conn., reports that the plant is now closed, and will remain closed until further orders from the Court.

Mr. Henry Connard, a machinist and brass founder of Reading, Pa., recently had a slight stroke of paralysis, but from which he is recovering very satisfactorily. Six years ago he had a stroke which affected his right side.

Joseph Cawley, formerly of Jas. Bonar & Co., Inc., and the Pittsburg Feed Water Heater Company, Frick Building, Pittsburgh, Pa., has been elected vice-president of the Cadwallader Tin Plate and Metal Company, of the same City.

George H. Wilcox, foreman for a number of years with Brabson Brothers, of Newark, N. J., has become foreman of the Wheaton Foundry. Jacob Ridlinghouse, assistant foreman of Brabson Brothers, has been promoted to foreman.

The partnership existing between Cateby Jones and Wayne J. Yerger, conducting the Hercules Brass Foundry, at Reading, Pa., has been dissolved by the withdrawal of Mr. Jones. Mr. Yerger will continue the business under the same name. The foundry turns out castings and patterns.

"I can earn my living with my hands if I must—I can earn it as a brass finisher," so spoke District-Attorney William Travers Jerome, of New York City, in addressing a meeting of the labor unions, when appealing to them for their support at the coming election. The brass finishers will be glad to learn that they have such a distinguished worker among their ranks.

Geo. G. Blackwell, chairman of Geo. G. Blackwell & Sons Company, Limited, of Liverpool, England, is visiting the United States, and will journey to the leading metal centers during the month, being at the Hotel Schenley, Pittsburgh, the first ten days of November. Mr. Blackwell has issued a circular on "Fluorspar," stating that the firm of which he is chairman own

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and work their mines, which they claim to be the largest in the world, and which are so conveniently located that they can supply both home consumption and that of the United States and Canada with any quantity and with regularity. He is in a position to take 12 months' contracts. Mr. Blackwell has also issued a unique memorandum book for the year 1906, which is a combination book and card case.

DEATHS

We regret to report the death of G. W. Quint, who died recently, aged 48 years. Mr. Quint was engaged for many years in the manufacture of metals, stencils, stamps and patterns at No. 155 S. 4th street, Philadelphia, Pa. He was a subscriber to *The Aluminum World* and THE METAL INDUSTRY for the past ten years. The business is continued by his brother, Charles H. Quint.

C. E. Mills, of Syracuse, N. Y., who was the proprietor of the C. E. Mills Oil Company, died on August 23 in that city. Mr. Mills was well known to all foundrymen throughout the country as a manufacturer of core oils and core compounds. His business will be continued in the same way by his son, Henry E. Mills, who has been connected with the firm for the past ten years.

METAL MARKET REVIEW

COPPER.—Prices in the London market for Standard copper have held very steady opening at £71 10s. Prices were run up to £72 15s. on the 17th and closed at £71 5s. The feature in the London market has been the scarcity of spot supplies and the decrease in the foreign stocks of copper.

The New York market has held very firm throughout the month with prices ruling from 16½c. to 16¾c. for Lake and Electrolytic. Special brands and urgent delivery may have brought slightly higher prices. Sales have been made for early next year delivery at 16½c., and producers claim prices are hardly likely to go any lower. The total exports for September were 19,758 tons against our estimate of 20,000 tons. For the month of October the exports will amount to about 19,000 tons. Prices for carload lots Lake and Electro, 16½ to 16⅝, Casting, 16¼c. Smaller lots about ¼c. higher all round.

TIN.—The London tin market has been active. Spot opened at £147 5s., declined to £145 10s. on the 9th and closed at £150, showing a net advance for the month of about £2 15s. per ton.

In the New York market there has been a fair demand from consumers and at the close a good business has been put through for future deliveries. The market closed strong and active for 5-10 ton lots spot 33.15c., 1 ton lots 33.25c. to 32.80c., futures 5 to 10 points lower.

LEAD.—The London market has ruled very strong opening at £14 2s. 6d., price steadily advanced to £15 at the close.

In the New York market lead has ruled very strong owing to a scarcity of spot supplies caused through delays in the railroads. Prices have advanced from 4.90c. to 5.25c. for spot carloads and at the close it is difficult to get any lead. The leading interest are still shipping lead at 4.85 but will not name any price for future shipments so that consumers cannot tell what price they will have to pay for their next supplies.

SPELTER.—London market very strong, opened at £27 10s., prices advanced to £28 15s. on the 24th and closed at £28 5s.

The New York market for spelter has been strong and active. Owing to the scarcity of ores prices were run up nearly ¼c. per lb. at the same time some sales for export were made and with a 6-cent market in St. Louis, home consumers started in to buy making price 6¼ New York shipment or equivalent. At the close the market is shade easier and the St. Louis market is close to 6-cent for November and December shipment.

OLD METALS.—The market has been strong and active. There has been a good demand for brass and copper scrap for abroad and considerable business has been done in zinc dross and skimmings—at the close good slab zinc dross is quoted at 5.05 to 5.10 and the market closes fairly strong.

TRADE WANTS

ANSWERS SENT IN OUR CARE WILL BE FORWARDED.

WANTED—One 42-inch SCHWARTZ FURNACE in good condition. Address SCHWARTZ, care THE METAL INDUSTRY.

WANTED.—Young man who is familiar with estimating on Brass and Steel specialties. Technical man preferred. Address YOUNG MAN, care THE METAL INDUSTRY.

WANTED—A BRASS FOUNDRY FOREMAN to take charge of a brass foundry in Chicago, Ill.; non-union; one familiar with moulding machines preferred. Address, with references, NON-UNION, care THE METAL INDUSTRY.

AGENCY WANTED—Want good selling article; metal goods preferred; other lines considered; have large store with bulk windows on main street in Philadelphia; would introduce new goods; established 40 years in metal line. Address NELLA, care THE METAL INDUSTRY.

ACCOUNTING AND AUDITING-BOOKS written up, balances taken off. Profit and loss statements and balance sheets and reports made. Small accounts solicited; high-class work done. Charges reasonable. JOHN C. ALMOUR, 257 Broadway, New York City.

WANTED TO MANUFACTURE CAST BRASS SPECIALTIES of all descriptions, or will manufacture good patented specialty on royalty. SHEELER HEMSHER CO., 811, 813, 815 Fairmount avenue, Philadelphia.

WANTED—Salesman to sell crucibles; give age, experience and salary expected. Address BRASS CRUCIBLE, care THE METAL INDUSTRY.

POSITION WANTED with reliable firm by a plater who is an expert on solutions and hustler on all colors. Understands silver deposit on glass and china. Address PLATER FOREMAN, care THE METAL INDUSTRY.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RADNAI, 284 Pearl street, New York City.

WANTED.—A first-class salesman well acquainted with the metal market. Fine opening for the right man. Address with full particulars MANUFACTURER, care THE METAL INDUSTRY.

SILVERSMITH desires position as mounter. Experienced on church plate work. Address SILVERSMITH, care THE METAL INDUSTRY.

FOR SALE.—Three Hill barrels for recovering metal from brass ashes. First-class condition. Address HILL BARREL, care THE METAL INDUSTRY.

ROLLING MILL EQUIPMENT FOR SALE.—One stand, 16x32, and one stand 17x24 chilled rolls, with two sets driving gear, all complete. One 4 ft. by 8 ft. annealing furnace. One No. 4 Cincinnati geared squaring shear, 36 in. knife. One No. 205 Niagara circle and slitting shear. One heavy Farrell foundry slitting shear, slits 3-16 stock, in use only one year and practically new. Also 12x30 Corliss engine and boiler complete; used to drive above, and several other items, pickle and water tubs, etc., for use in rolling sheet silver, brass or kindred metals. Address ROLLING EQUIPMENT, care THE METAL INDUSTRY.

INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds. Send for circular.

Metal Prices, November 3, 1905

METALS

	Price per lb.
TIN—Duty Free.	
Straits of Malacca	33.25
COPPER, PIG, BAR AND INGOT AND OLD COPPER—Duty Free. Manufactured 2½c. per lb.	
Lake	17.00
Electrolytic	16.75
Casting	16.50
SPELTER—Duty 1½c. per lb.	
Western	6.25
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig Lead	5.25
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	37.00
100 lb. lots	35.00
1,000 lb. lots	34.00
Ton lots	33.00
ANTIMONY—Duty ¾c. per lb.	
Cooksons	13.50
Hallets	13.00
Other	12.50
NICKEL—Duty 6c. per lb.	
Large lots	45 to 50
Small lots	50 to 75
BISMUTH—Duty Free	$1.50 to $2.00
PHOSPHORUS—Duty 18c. per lb.	
Large lots	45
Small lots	65 to 75
	Price per oz.
SILVER—Duty Free	$0.62⅝
PLATINUM—Duty Free	21.00
GOLD—Duty Free	20.67
QUICKSILVER—Duty 7c. per lb. Price per Flask.	41.00

Zinc—Duty, Sheet, 2c. per lb. 600-lb. casks, 7.50 per lb., open, 8.50 per lb.

Tobin Bronze—Rods, Unfinished, 20c.

Tobin Bronze—Rods, Finished, 21c.

PRICE FOR ALUMINUM BRONZE INGOTS.

	Per pound.
2½ per cent	19c.
5 per cent	19½c.
7½ per cent	20½c.
10 per cent	21½c.

Manganese Bronze, Ingots	16 to 17c.
Phosphor Bronze, Ingots	16 to 20c.
Silicon-Copper, Ingots	32 to 36c.

OLD METALS

Heavy Cut Copper	14.75	15.00
Copper Wire	14.50	14.75
Light Copper	13.00	13.25
Heavy Mach. Comp	12.00	13.00
Heavy Brass	9.25	9.50
Light Brass	8.00	8.25
No. 1 Yellow Brass Turnings	8.50	8.75
No. 1 Comp. Turnings	10.50	11.00
Heavy Lead	4.85	4.95
Zinc Scrap	4.75	5.00
Scrap Aluminum, sheet, pure	22.00	25.00
Scrap Aluminum, cast, alloyed	12.00	18.00
Old Nickel	15.00	25.00
No. 1 Pewter	21.00	23.00

PRICES OF SHEET COPPER

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	21	21	21	21	21	22
	Longer than 72 ins. Not longer than 96 ins.	21	21	21	21	21	22
	Longer than 96 ins.	21	21	21	21	21	23
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	21	21	21	21	21	23
	Longer than 72 ins. Not longer than 96 ins.	21	21	21	21	21	23
	Longer than 96 ins. Not longer than 120 ins.	21	21	21	21	22	24
	Longer than 120 ins.	21	21	21	22	23	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	21	21	21	22	23	25
	Longer than 72 ins. Not longer than 96 ins.	21	21	21	22	24	26
	Longer than 96 ins. Not longer than 120 ins.	21	21	21	23	25	29
	Longer than 120 ins.	21	21	22	24	27	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	21	21	21	22	24	27
	Longer than 72 ins. Not longer than 96 ins.	21	21	21	23	25	30
	Longer than 96 ins. Not longer than 120 ins.	21	21	22	24	27	
	Longer than 120 ins.	22	22	23	25	29	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	21	21	22	24	29	
	Longer than 96 ins. Not longer than 120 ins.	21	21	23	26	31	
	Longer than 120 ins.	22	22	24	29		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	22	22	24	27		
	Longer than 96 ins. Not longer than 120 ins.	23	23	25	28		
	Longer than 120 ins.	24	24	26	30		
Wider than 108 ins.	Not longer than 132 ins.	25	25	27			
	Longer than 132 ins.	26	26	29			

Rolled Round Copper, ⅜ inch diameter or over, 21 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 2½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, November 3, 1905

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb.....25c.
Lighter than 10 oz.....31c.
10 oz. and up to 12 oz.....28c.
12 oz. and up to 14 oz. to square foot, per lb.....26c.
Circles less than 8 in. diam., 2c. per lb. additional.
Circles over 13 in. diam. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICE LIST FOR ROLL AND SHEET BRASS

Prices are for 100 lbs. or more of sheet metal in one order.
Brown & Sharpe's Gauge the Standard.

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2 12	12 14	14 16	16 18	18 20	20 22	22 24	24 26	26 28	28 30
To No. 20 inclusive..	.22	.23	.25	.27	.29	.31	.33	.36	.39	.42
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	.40	.43
Nos. 25 and 26.....	.23	.24½	.27	.29	.31	.33	.35	.38	.41	.44
Nos. 27 and 28.....	.23	.25	.28	.30	.32	.34	.36	.39	.42	.45

Add ½ cent per lb. additional for each number thinner than Nos. 28 to 38, inclusive.

Add 7 cents per lb. for sheets cut to particular lengths, not sawed, of proportionate width.

Add for polishing on one side, 40 cents per square foot; on both sides, double this price.

Brazing, Spinning and Spring Brass, 1 cent more than Common High Brass.

Extra Quality Brazing, Spinning and Spring Brass, 2 cents more than Common High Brass.

Low Brass, 4 cents per lb. more than Common High Brass.

Gilding, Rich Gold Medal and Bronze, 7 cents per lb. more than Common High Brass.

Discount from list 25 per cent.

PRICE LIST FOR BRASS AND COPPER WIRE

BROWN & SHARPE'S GAUGE THE STANDARD.	Com. High Brass	Low Brass	Gilding Bronze and Copper
All Nos. to No. 10, Inc	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
Nos. 17 and 18	.24	.28	.29
" 19 and 20	.25	.29	.30
No. 21	.26	.30	.34
" 22	.27	.31	.35
" 23	.28	.32	.36
" 24	.30	.34	.38

Discount, Brass Wire, 25 per cent.; Copper Wire, 25 per cent.

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ in. to 8½ in. O. D. Nos. 4 to 13 Stubs Gauge, 20c. per lb.
Seamless Copper Tubing, 23c. per lb.
For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes

Iron Pipe size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb	28	27	22	21	20	20	20	20	20	20	20	21	22	24	26	27

BRAZED BRASS TUBING

Brown & Sharpe's Gauge the Standard.

										Per lb
Plain	Round	Tube,	¾	in.	up	to	2	in.,	to No. 19,	inc.	$0 35
"	"	"	2	"	"	"	3	"	" 19,	"	30
"	"	"	3	"	"	"	4	"	" 19,	"	38
"	"	"	4	"	"	"	5	"	" 19,	"	41
"	"	"	5	"	"	"	6	"	" 19,	"	48
"	"	"	6	"	"	"	7	"	" 19,	"	65
"	"	"	7	"	"	"	8	"	" 19,	"	1 00
			⅛	"	"	"	⅜	"	" 19,	"	1 50
Smaller than ⅛ inch											Special
3 inch to 3 inch, to No. 19, inclusive											38
3 inch											40
Over 3 inch to 3⅛ inch											45
Over 3⅛ inch											58

Bronze and copper advance 3 cents. Discount 33 1-3 per cent.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than and including	3 in. 12 in. in coils.	6 in. 14 in.	14 in. 16 in.	16 in. 18 in.	18 in. 20 in.	20 in. 24 in.	24 in. 30 in.	30 in. 36 in.	36 in. 40 in	Cutting to Length.	Polishing or Satin Finishing One side.
No. 13	42	42	44	44	44	44	47	47	47	1	2
" 14	42	42	44	44	44	44	47	47	47	1	2
" 15	42	42	44	44	44	44	47	47	47	1	2
" 16	42	42	44	44	44	44	47	47	47	1	2
" 17	42	42	44	44	44	44	47	47	47	1	3
" 18	42	42	44	44	44	44	47	47	50	1	3
" 19	42	42	44	44	44	44	47	48	51	1	4
" 20	42	44	44	44	44	46	49	50	52	1	4
" 21	42	46	46	46	46	48	51	52	58	2	5
" 22	42	46	46	46	48	48	51	55	59	2	5
" 23	42	46	46	46	48	48	51	57	60	2	6
" 24	42	46	48	50	50	50	53	59	62	2	6
" 25	44	47	49	51	51	51	54	61	65	2	7
" 26	44	47	50	54	54	54	59	63	69	2	8
" 27	44	48	52	56	56	57	62	66	72	2	10
" 28	44	48	54	56	57	57	64	70	75	2	11
" 29	46	49	56	58	60	60	69	75	80	2	13
" 30	46	50	58	60	64	70	77	80	85	2	15
" 31	48	52	60	63	68	76	79	82	88	3	17
" 32	50	54	62	66	74	82	89	95	100	3	19
" 33	52	56	65	70	78	89	96	05	115	3	21
" 34	55	60	67	75	83	96	108	115	125	3	25
" 35	.....	70	75	85	95	105	120	130	.....	.....	Polished or Scratch Brushed 2 sides double above prices.
" 36	.....	85	95	105	120	125	140	.....	.....	.....	
" 37	.....	100	110	125	140	155	170	.....	.....	.....	
" 38	.....	120	135	150	165	180	200	.....	.....	.....	
" 39	.....	140	160	180	200	220	.....	.....	.....	.....	
" 40	.....	170	200	220	240	.....	.....	.....	.....	.....	

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheeet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

Discounts as Follows are Given for Sheet Orders Over 200 Pounds.

200 to 1,000 pounds.....10 per cent. off list.
1,000 to 2,000 " 10 per cent. and 2 " "
2,000 to 4,000 " 10 " " 3 " "
4,000 pounds and over 10 " " 5 " "

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

STUBS' G.	1-4"	3-8"	1-2"	5-8"	3-4"	1"	1 1-2"	2"	2 1-2"	2 3-4"
4 to 11	.....	.....	96	86	83	77	67	61	61	61
12	.....	1 08	96	86	83	77	67	61	61	61
13	.....	1 08	96	86	83	77	67	64	64	64
14	.....	1 08	96	86	83	77	67	64	64	64
15	.....	1 12	96	89	86	80	70	67	67	67
16	.....	1 15	99	93	89	83	70	70	70	70
17	.....	1 18	1 02	96	93	86	78	73	73	73
18	1 85	1 24	1 05	99	93	86	77	77	77	80
19	1 88	1 28	1 08	1 02	99	93	83	86	80	83
20	1 95	1 31	1 15	1 06	1 05	99	89	86	86	89
21	2 01	1 37	1 21	1 15	1 12	1 05	99	93	93	96
22	2 17	1 44	1 24	1 18	1 15	1 08	1 05	99	1 05	1 05
23	2 33	1 50	1 31	1 24	1 21	1 15	1 15	1 08	1 15	1 15
24	2 48	1 60	1 37	1 31	1 28	1 18	1 21	1 21	1 24	.....
25	2 65	1 69	1 47	1 37	1 34	1 28	1 34	.....	.....	.....

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

Discounts as Follows are Given for Tube Orders Over 50 Pounds.

50 to 200 lbs.....5 per cent. discount off list
200 to 2,000 lbs.....10 " " " " "
2,000 to 4,000 lbs.....10 and 3 " " " " "
4,000 lbs. and over.....10 and 5 " " " " "

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B.& S.G'ge.	0000 to No. 10	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price per lb	$ 38	38½	38½	0 39	39½	0 40	40½	0 41	0 42	0 43	0 44	0 47	0 53

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	.58
13	.53	17	.59
14	.54	18	.60
15	.56		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50 per cent.